MECCANO® Magazine

JULY 1969

TWO SHILLINGS AND SIXPENCE

U.S.A. AND CANADA 60 CENTS.

HOBBY MAGAZINE

★ STAMPS ★ MECCANO ROAD ROLLER ★
"N" GAUGE RAILWAY LAYOUT ★ BATTLE
★ SUBMARINES ★ DINKY SPEEDWHEELS

MAP

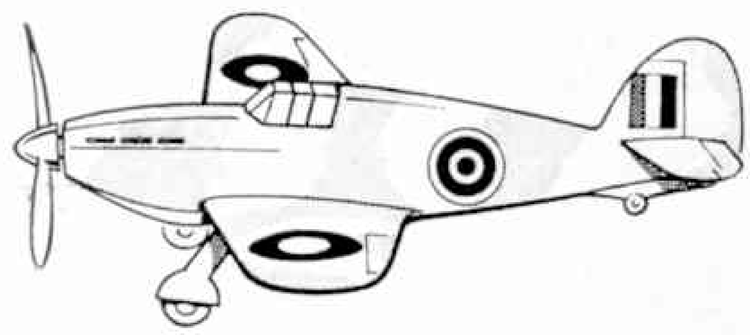
RAILWAYS PLASTICS AEROMODELLING BOATS CARS STAMPS MECCANO SCIENCE

KEILKRAFT EEZEBILT KITS

DESIGNED WITH THE NOVICE IN MIND

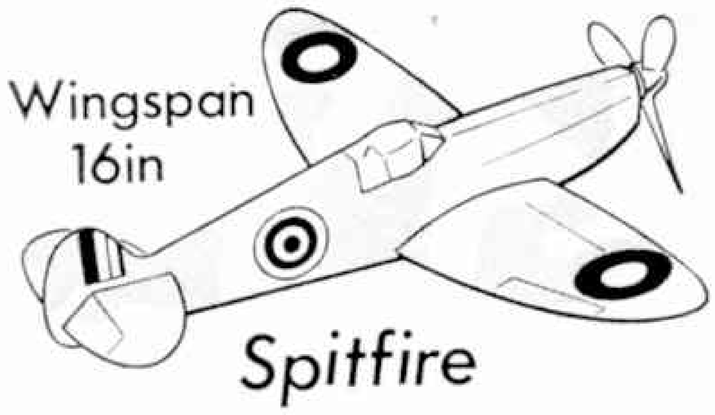
WORLD WAR II

Wingspan 16in



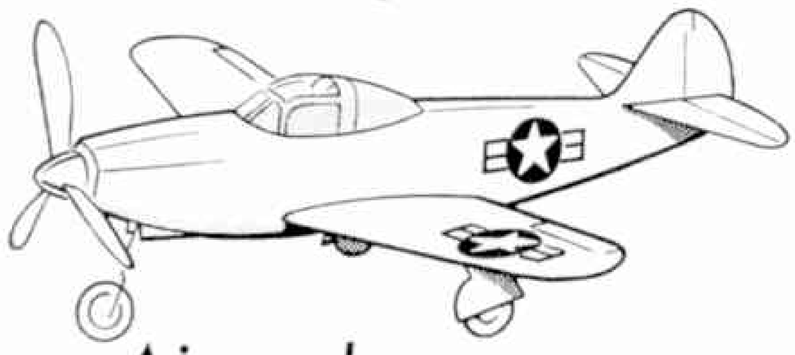
Hawker Hurricane
Wingspan 17 3/4in

Mustang

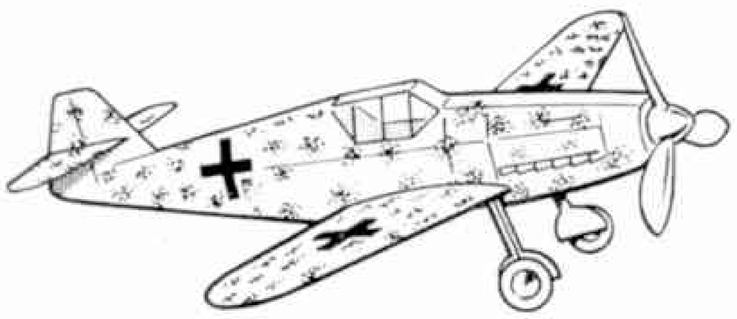


Wingspan 16in

Spitfire



Airacobra
Wingspan 15in



Me 109 Wingspan 16 1/2in

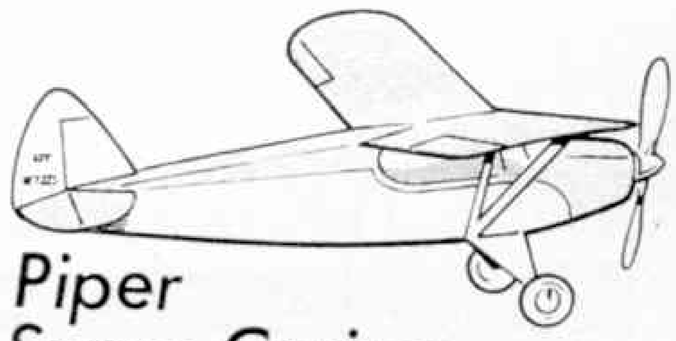
COMPLETELY PREFABRICATED SCALE MODELS

ALL 10/- EACH

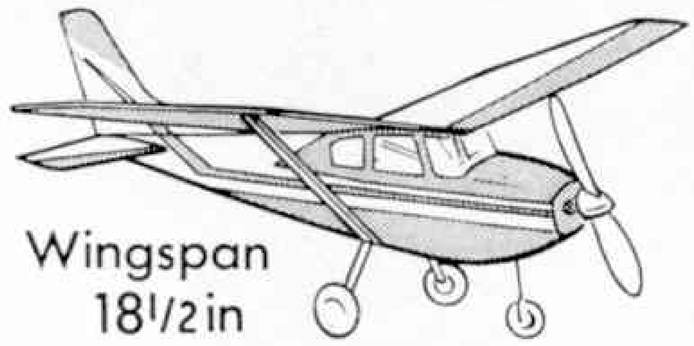
Each Kit includes

- **Die-cut parts printed in colour.**
- **Plastic prop. & nosepiece.**
- **Preformed undercarriage.**

CIVILIAN

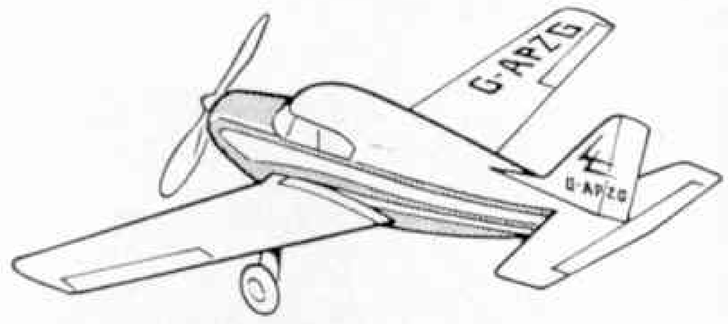


Piper Super Cruiser
Wingspan 19in



Wingspan 18 1/2in

Cessna Skylane



Piper Comanche
Wingspan 18in

KEILKRAFT EEZEBILT BOATS

OTTER, CURLEW, TERRIER 11/10d. Each.

Average length 11 in.

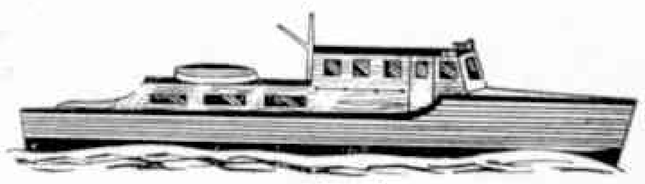
KEILKRAFT *Otter*

KEILKRAFT *Terrier*

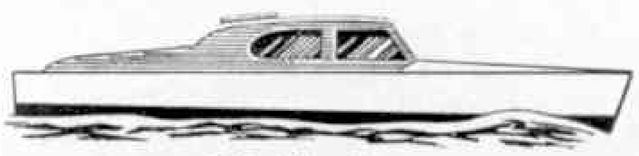
KEILKRAFT *Curlew*

TRITON, NEPTUNE, CRESTA, MERMAID 18/9d. Each

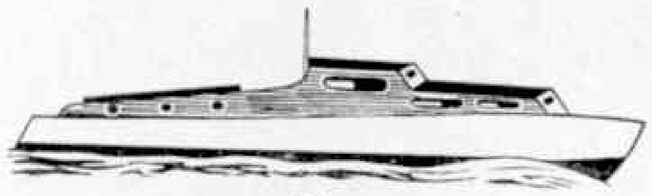
Average length 16 in.



KK *Triton*



KK *Neptune*



KK *Mermaid*

KK *Cresta*

MECCANO® Magazine

JULY 1969 VOLUME 54 NUMBER 7

Meccano Magazine, founded 1916.

Editorial Director
D. J. LAIDLAW-DICKSON

Editor
DAVE ROTHWELL

Consulting Editor for Meccano Ltd.
J. D. McHARD

Advertisement Manager
ROLAND SUTTON

MAP **HOBBY MAGAZINE**

FRONT COVER

Full credit for our attractive front cover this month must go to reader S. L. Harris, a Fireman from Plymouth.

The model itself is a fully operational replica of a typical Dockyard Crane, and stands approximately 3 ft. high. The impression of greater size is created by the authentic background. To achieve this, the model was placed on the jetty at Milbay Docks, Devonport, with a stretch of water approximately 100 yards wide between it and the buildings on the far side. The results speak for themselves, and certainly add to the interest of the model. Meccano modellers may try to create similar scenes for model photography, I think most will agree that the end results are well worth the effort!

NEXT MONTH

Big news for the August issue of *Meccano Magazine* is the first of the "Radio 4-2" series, outlined on page 337 of this issue. Construction of a Radio Controlled boat commences in the issue, and has all the indications of being a big hit. A feature on Lightweight Camping, written for beginners to this recreation by the Editorial Staff should provide interesting reading for everyone, and with Summer well on its way should prompt many readers into spending some time under canvas. Yet another series gets under way in the August issue, when *Meccano Magazine* takes a look at the world of two wheels. The first article will describe the merits of transport by motor cycle —scooter and moped, and discusses the problem of which type to choose. All subsequent articles will be review of all types of two-wheelers, up to 250 ccs. These will be photographed and tested by us, and should serve as a good guide to those with thoughts on getting around in this manner.

All the regulars will, of course, appear, Meccano features, Stamps, Battle, plus many others.

Advertisement and Subscription Offices: Model & Allied Publications Ltd., 13-35 Bridge Street, Hemel Hempstead, Hertfordshire. Tel.: Hemel Hempstead 2501-2-3.

Second class postage rates paid at New York, N.Y. Registered at the G.P.O. for transmission by Canadian Post. American enquiries regarding subscriptions, news stand sales and advertising should be sent to MECCANO MAGAZINE, Eastern News Distributors Inc., 155 West 15th Street, New York, N.Y. 10011, U.S.A., U.S.A. and Canada direct subscription rates $5 including index.

This periodical is sold subject to the following conditions: that it shall not, without the written consent of the publishers, be lent, re-sold, hired-out or otherwise disposed of by way of Trade at a price in excess of the recommended maximum price and that it shall not be lent, re-sold, hired-out or otherwise disposed of in a mutilated condition, or in any unauthorised cover by way of Trade; or affixed to or as part of any publication of advertising, literary or pictorial matter whatsoever.

Publishers of Aeromodeller, Model Boats, Model Cars, Model Engineer, Radio Control Models, Model Railway News.

CONTENTS

WORKBENCH 329
News and Views by the editor

THERE SHE BLOWS ! 330
Modern Whaling

AIRBORNE CHECK ON NATURE 332
Using Aircraft to observe wildlife

WAGING WAR ON LOCUSTS 334
Man's struggle to exterminate a pest

RADIO 4-2 337
Introduction to a new series

AIR NEWS 338
John W. R. Taylor on aviation

JEEPS OF THE DEEP 340
Modern miniature submarines

COLLECTORS' CORNER 342
B. N. Love looks at an early Meccano Clockwork Motor

DRIVING SCHOOL FOR SCHOOLS 343
Teaching students how to drive

MODIFICATIONS TO HORNBY 345
Updating old Hornby Rolling Stock

BUILDING AN "N" GAUGE LAYOUT 346
A new series on railway modelling

TRANSPORT IN THE PAST 348
A. W. Neal describes some unusual vehicles

THE CINEMA ON STAMPS 349
Stamps on a theme by James A. Mackay

COMMUTER CAR 350
A simple Meccano model for youngsters

GREAT ENGINEERS 352
No. 18 Sir Harry R. Ricardo

MECCANO REPORT 353
Midlands Meccano Guild's 4th Guild Meeting

BEAM ENGINE 356
A simple model in plastic Meccano

ROAD ROLLER 357
An unusual model for advanced builders

AMONG THE MODEL BUILDERS 360
Readers' Meccano ideas

HAVE YOU SEEN ? 362
The latest products reviewed

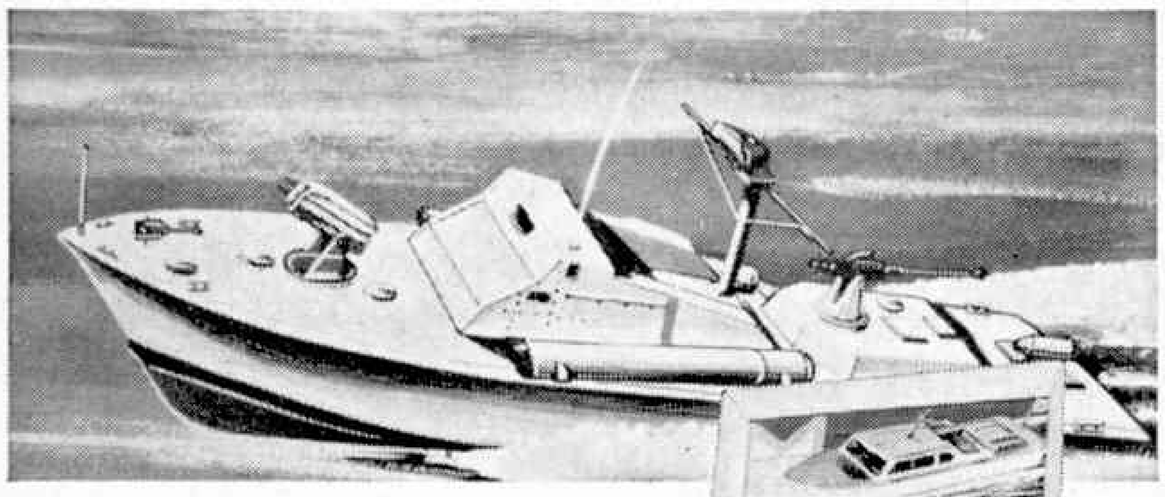
DINKY TOY NEWS 363
Chris Jelley reviews the latest Dinky toy

BATTLE 364
Part XV—Infantry Organisation

MODEL & ALLIED PUBLICATIONS LTD.
13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTFORDSHIRE

GO

WITH THE MAINSTREAM SUPER POWERED BOAT KITS



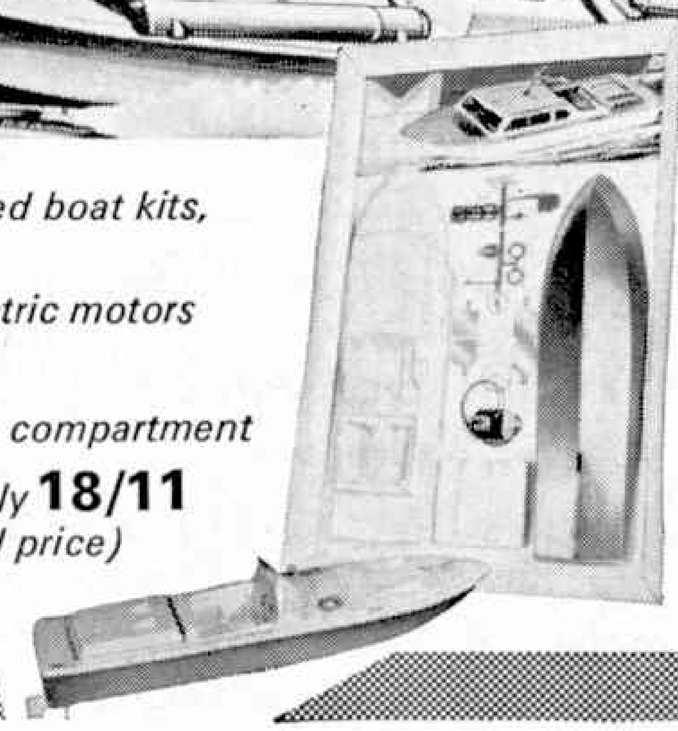
Four superbly detailed boat kits, each with:

**High powered electric motors*

**Sleek high lift hull*

**Waterproof battery compartment*

Easy to build and only **18/11**
(recommended retail price)



PLUS THE AMAZING MAINSTREAM PP1 HOVERCRAFT KIT

Complete with powerful electric motor.

It glides on a cushion of air—just like the real thing

Recommended Retail Price 24/-

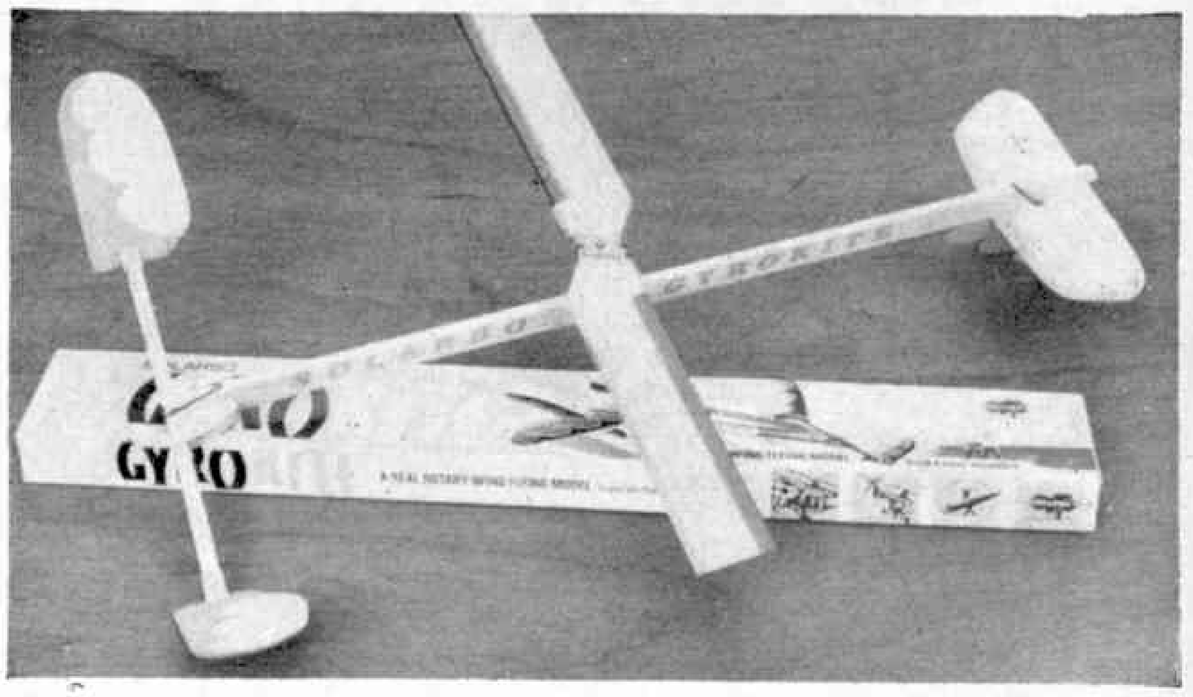
At your local model shop now!

MAINSTREAM PRODUCTIONS LTD.

HALLAM STREET WORKS · HALLAM STREET
STOCKPORT · CHESHIRE · SK2 6QQ

MS7/69

NEW! Solarbo GYROKITE



Here's a model which really is different, working on the same principles as a full size rotary wing aircraft (and designed by a full size helicopter pilot). Hours of fun with perfectly stable high altitude flights in any nice breeze ! This very SPECIAL KIT includes all balsa parts finish shaped (and colour decorated), precision moulded plastic rotor hinge parts and stabiliser fin mounts, flying line, etc. . . . even cement ! A REALLY COMPLETE and FULLY PREFABRICATED kit . . . plus full instructions and a leaflet about Rotary Wing Aircraft. New reduced price of 22/6 and obtainable from any good model shop . . . or you can order direct with the coupon below. It's a super kit !

For other models that are different AND REALLY INEXPENSIVE, try working from our plans. These are available to 'MM' readers at a purely nominal price, post free to your address. They must be about the best value for money in modelling today — like Solarbo Balsa ! There's nothing to beat Solarbo Balsa when it comes to quality.

Please send me the 4/12* plans marked. I enclose Postal Order value 1/- / 2/6* as per your special offer.

- ☐ **TWO-STROKE ENGINE**
- ☐ **TEMPERATURE CONVERTER (degrees C to degrees F)**
- ☐ **CLINOMETER**
- ☐ **SLIDE RULE**
- ☐ **UNIT COUNTER**
- ☐ **MAGIC SQUARES**
- ☐ **CUBES**
- ☐ **TOWER OF HANOI**
- ☐ **WORKING MICROMETER**
- ☐ **MODEL ACRE & HOUSES**
- ☐ **EGYPTIAN COMPUTER**
- ☐ **CIRCUMFERENCE MEASURE**
- ☐ **O-X-O PUZZLE**
- ☐ **EGYPTIAN SUNBAR**
- ☐ **KON TIKI RAFT**
- ☐ **NORMAN CASTLE**
- ☐ **SCALE HUMAN FIGURE**

For **GYROKITE KIT** tick this square ☐ I enclose remittance of 22/6 for **SOLARBO GYROKITE KIT (Post free)**

NAME .....

ADDRESS .....

M/M .....

Solarbo LTD.
COMMERCE WAY, LANCING, SUSSEX

At the ship's nerve centre these men fight a 'Battle'

You are looking at the operations room of one of the Navy's new guided missile destroyers.

It is dimly lit. All round you are radar sets that look like TV screens. Silent men watch them intently. Luminous shapes appear and disappear on the screens.

They represent ships. Submarines. Aircraft. And computers calculate their course and speed.

This is the 'enemy'. And in this way the ship's Captain can direct the course of the battle. Launch missiles to punch aircraft out of the sky. Send helicopters and torpedoes to attack submarines. Order rapid fire from electronically-controlled guns. And all this from the centre of the ship!

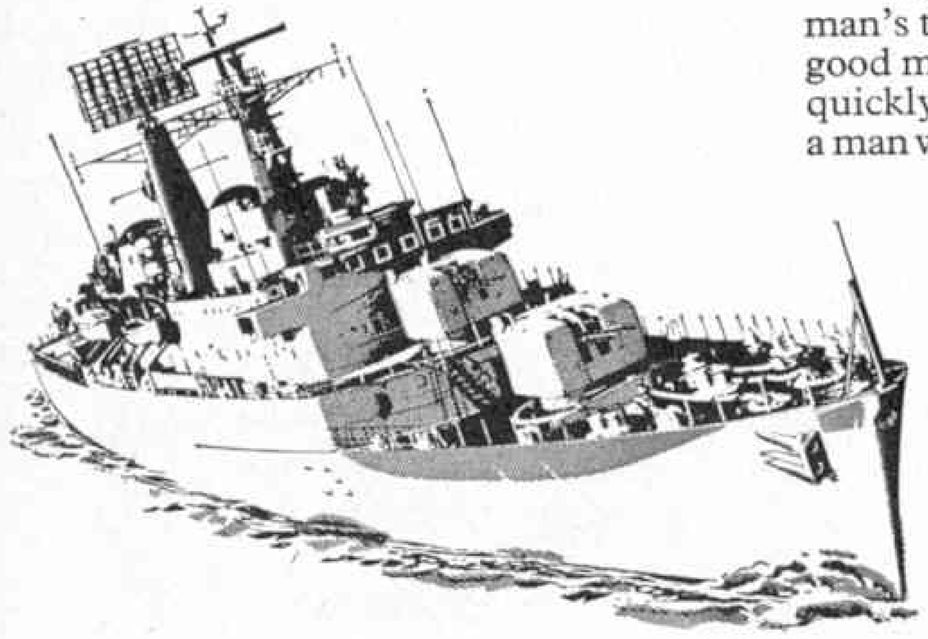
This is what happens when a modern navy ship takes part in 'battle' exercises.

That's how fast the Navy has changed since the days of the big battleship. It's a new, technical Navy. More advanced. More mobile. More powerful. And more exciting for the modern sailor.

Today he's likely to have a skilled man's trade. To earn good money. Get ahead quickly. And he's still a man who loves the sea, with a life of travel and adventure.

If you'd like to know more about life in today's Navy post the coupon for the free booklet.

Entry as an officer. Are you aiming for at least 5 G.C.E. 'O' levels—or equivalent? Then you could apply now, even at the age of 14, for entry between 17 and 19½ as an officer in the Royal Navy. Don't fill in the coupon, but write for full details to Captain W. J. Graham, R.N., Officer Entry Section (**703YM3**), Old Admiralty Building, London, SW1.



Name _____

Address _____

_____

Date of birth _____

Royal Naval Careers Service (703YM3), Old Admiralty Building, London, SW1. Please send me, without obligation, the free booklet 'The Royal Navy as a Career'.

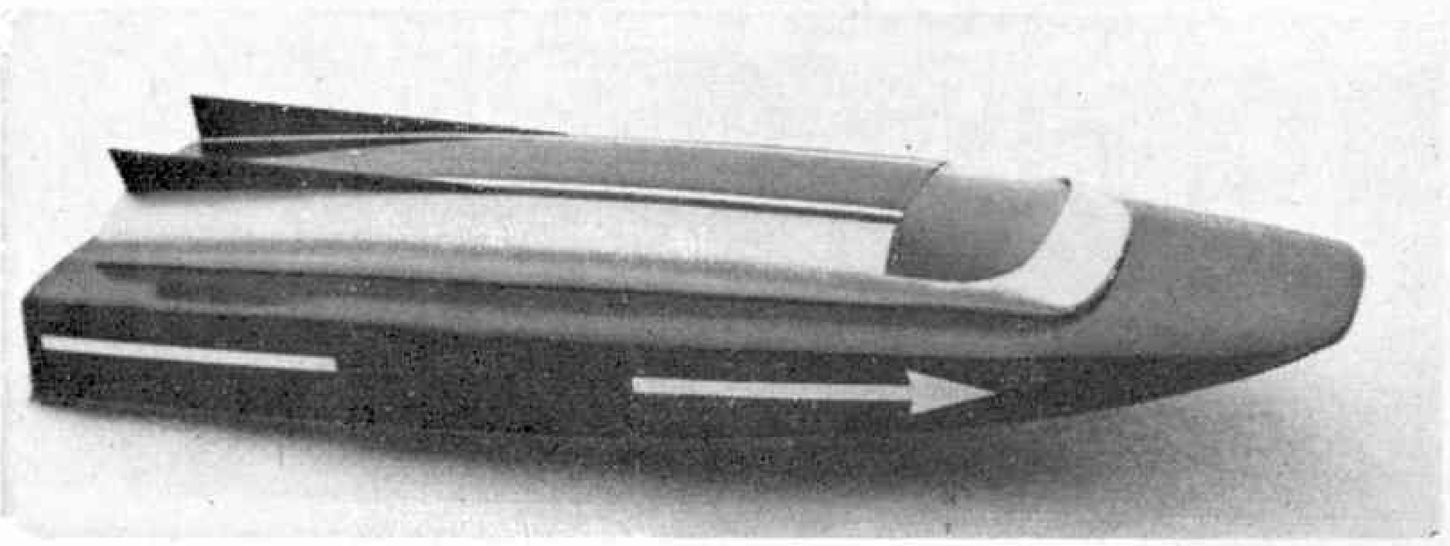
(*Enquiries from U.K. residents only.*)

RN ROYAL NAVY

Model Boats

Fast Electric R/C Steering Boat

2/6



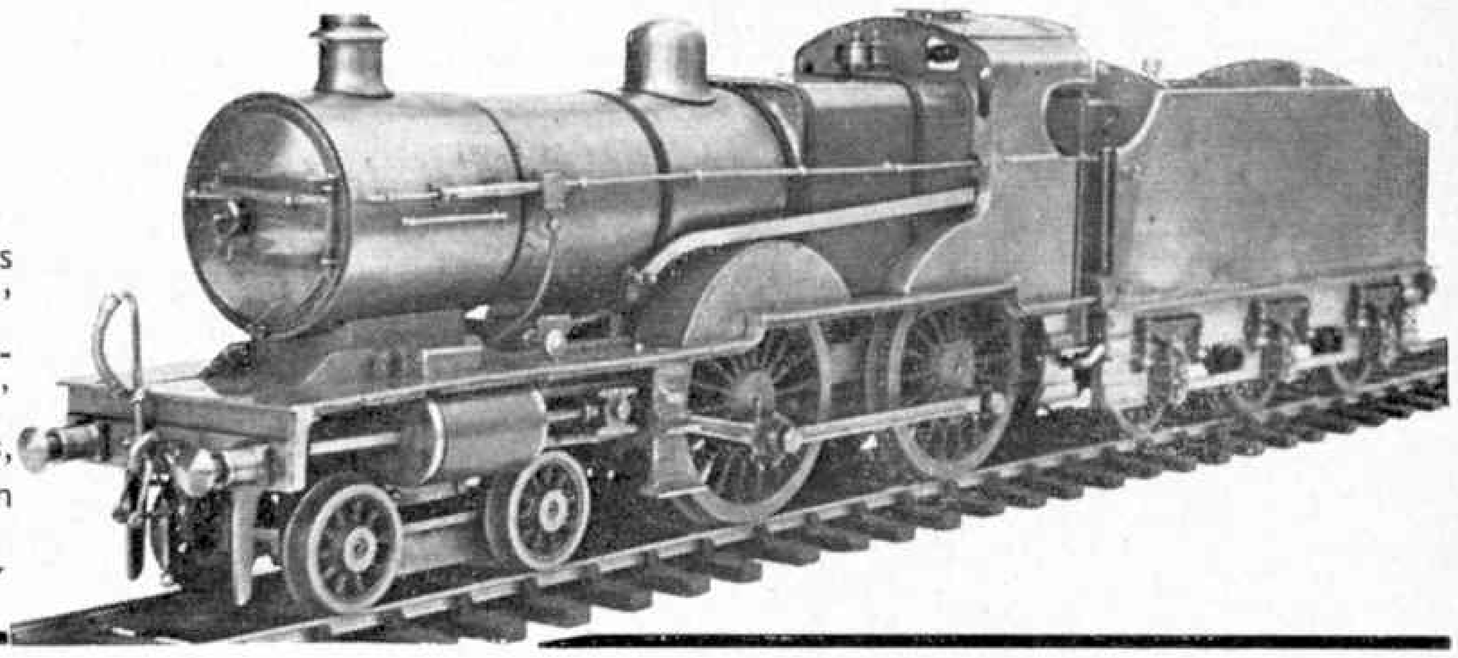
JULY issue also carries . . . Yorkshire coble with plans for an authentic model. Drawings of naval HA/LA guns. Reader's model of the battleship *Duke of York* with simple R/C detail. Period ship H.M.S. *Shannon*. Modern merchant ships *Baron Holberg* and *Sterling*. More on converting Revell's *Alabama* to a working model.

4th FRIDAY

Model Railway News

O GAUGE HIGH PRESSURE STEAMER

July 2/6



Narrow gauge French industrial engine in Dennis Allenden's series on " La Ballastiere de Chailloue." New angle on cab control from America—" X-Section." Detailed drawings S. & M.R. "Severn" by Les Derbyshire. Plus popular Tinplate Topics, Hand-lettering Model Wagons, Simple Station Buildings and lots more.

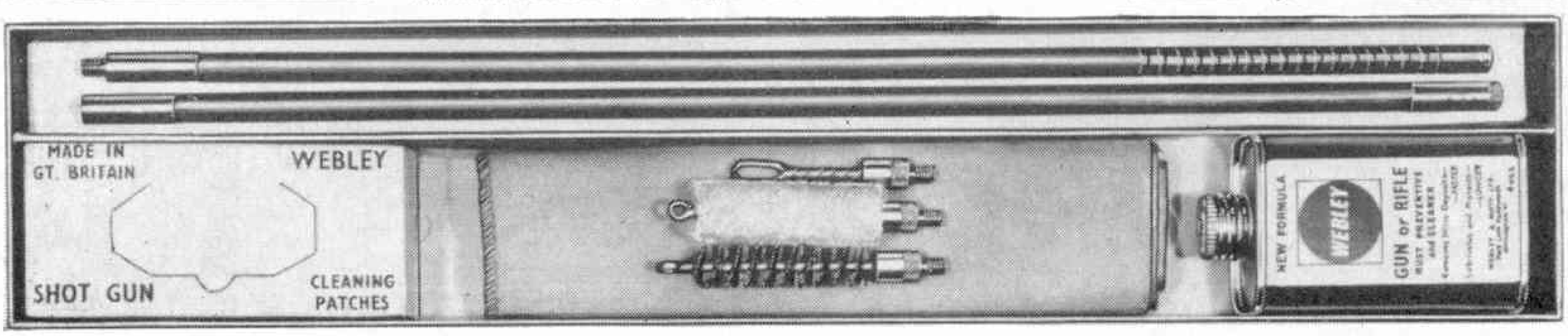
2nd FRIDAY

Get on target with Webley

Webley backs its products with a big range of accessories all designed to get the best out of your shooting.
The Webley cleaning set contains a two-piece cleaning rod, a 4 oz. tin of new formula cleaner, cleaning patches, and cloth. The new formula cleaner is also available separately in 5 oz. aerosols.
Two superb telescopic sights specially made for Webley get you on target every time.
Want better shooting results? Try our carefully gauged pellets and darts. Target cards and Target holders and many other accessories add to the comprehensive range. Get together with Webley for top performance.

Shooting Accessories

For full details of the full Webley range write to:
Webley & Scott Ltd. (Inc. W. W. Greener Ltd.), Dept. MM/AC1,
Park Lane, Handsworth, Birmingham 21, Tel: 021-553 3952



RADIO

S.A.E. brings free brochure. An introduction to R/C control and details of the world's best single channel tone guidance system. Over 5,000 in current use throughout the world, quantity produced and fully guaranteed for best range and quality at only **£13**. Complere 6 and 10 channel Multi Reed outfits with or without Servo Packs, from **£35½**. Digital two, three, four and five channel Proportional equipment from **£84**. Good selection of second-hand Radio always in stock.

VISIT THE LARGEST MODEL STOCKISTS IN THE COUNTRY

★ STAFFED BY EXPERTS ★ PART EXCHANGE ★ H.P. FACILITIES ★MAIL ORDER INCLUDING OVERSEAS ★

ORDERS UNDER £3 POSTAGE & PACKING 2/-

All Shops open until 8.30 p.m. Friday. Leicester, Weston and Wimbledon closed Monday. Isleworth open each weekday.

WE SERVICE ALL RADIO EQUIPMENT WE SELL

KITS, ENGINES, ACC.

We stock all current Kits, Engines and Accessories. We hold large stocks of Balsa and plywood as well as engine spares, radio parts and kits of parts. We always have bargain lines, as well as a good selection of second-hand Boats, Aircraft, Marine and Air-cooled Engines.

560 0473 **RADIO CONTROL SUPPLIES** LEIC. 21935

581 LONDON ROAD, ISLEWORTH, MIDDX. 52a LONDON ROAD, LEICESTER

154 MERTON ROAD, WIMBLEDON 540 4887 1 THE CENTRE, WESTON-SUPER-MARE WESTON 6600

LOOK—IT COSTS YOU NOTHING

To find out more about the many interesting products advertised in this issue of MECCANO Magazine. Just tick the squares against the name of the advertiser from whom you would like to receive more product information and post it to: Advertisement Information, Meccano Magazine, 13-35 Bridge Street, Hemel Hempstead, Herts.

JULY COUPON

- ☐ Beatties
- ☐ Humber Oil
- ☐ KeilKraft
- ☐ Mainstream
- ☐ Meccano Ltd. (Dinky)
- ☐ Radio Control Supplies
- ☐ Royal Navy Recruiting
- ☐ Solarbo
- ☐ Subbuteo Sports Games
- ☐ Frederick Warne (Observer Books)
- ☐ Webley & Scott

Name.....

Address.....

.....

MECCANO SPARES

WORLD WIDE

MAIL ORDER SERVICE

Don't wait for Meccano Sets or Spares— We will send them by return post if you cannot visit our wonderful shops.

(U.K. POST 3/6)

Our MECCANO SPARES display boards at SOUTHGATE & HOLBORN enable you to pick what you want without worrying assistants to open drawers and packages.

We will send you priced order forms free if you will send us a foolscap stamped addressed envelope.

WE EXPORT MECCANO TO ENTHUSIASTS ALL OVER THE WORLD AT A REDUCTION OF 20% OFF U.K. PRICES—THIS GENERALLY PAYS YOUR POSTAGE. We will quote sets or spares by return AIRMAIL.

BEATTIES OF LONDON

Head Office and Mail Order:

5-10 & 15 BROADWAY - SOUTHGATE - LONDON N.14

112 & 112A HIGH HOLBORN - LONDON W.C.1

28 CORPORATION STREET - MANCHESTER 4

SUBBUTEO Regd.

TABLE CRICKET

THE ACTION-PACKED TABLE CRICKET GAME

A NEW TABLE GAME – where the Cricket enthusiast can reproduce, at will, all the finesse of the great Summer game. Play your own:–TEST MATCHES! COUNTY CHAMPIONSHIPS! GILLETTE and CHARRINGTON CUP MATCHES! SUNDAY LEAGUE CRICKET! With all the skill of real cricket:– bowling, double wickets and all the OUTS, such as clean bowled, stumped, caught, L.B.W., run out, etc. Spin, leg and off breaks. Hits for six, four and odd runs.

DISPLAY EDITION
COMPLETE with 00 Scale Miniature Painted Cricketers, stumps, ball, etc.
27/6

CLUB EDITION
COMPLETE with 00 Scale Miniature Painted Cricketers, stumps, ball etc. together with Green Baize Cricket pitch.
52/6

TEST MATCH EDITION
COMPLETE with 00 Scale Miniature Painted Cricketers, stumps, ball etc. with Green Baize Cricket pitch, Sightscreens, Groundsmen & Roller, Spectators, Deck Chairs & Scoreboard.
72/6

Ask at your local Sports or Toy Shop or Departmental Store. In case of difficulty, write for List of Stockists, to:-

SUBBUTEO Dept C39 Langton Green Tunbridge Wells, Kent

Scale Models

OUT OCTEMBRE!

ANOTHER MAP HOBBY MAGAZINE

SOMETHING ABOUT

Scale Models

It will cover anything, but anything that is a scale model of some full-sized prototype. Thus we have the more obvious items of aircraft, boats, tanks, cars, military miniatures. . . . Locomotives are normally covered adequately elsewhere so will be very much soft-pedalled but there are heaps of other aspects which qualify . . . for example architectural models, cutaway models, dioramas, surgical models, miniature furniture, armour, musical instruments, miniature Inn Signs (do you remember the Watney's series?) and so on. . . .

Whether models are just to look at, to work without "going places," or to be fully operational is up to readers. So is the question of materials . . . plastics will loom large, but then so will fibreglass, expanded polystyrene and all the traditional materials down to good old wood. . . .

HOW YOU CAN HELP

Best way will be to join our regular readers just as soon as you can. But meanwhile you can be of help in formulating the policy of what you will be reading about by sending us your name and address. We will then send you more details of our projected SCALE MODELS and a questionnaire to complete and return setting out your wants and hopes.

Model & Allied Publications Ltd.

13/35 Bridge Street, Hemel Hempstead, Herts.

Is on the Way!

BACKGROUND TO SCALE MODELS

The fantastic detail and infinite variety of modern plastic model kits and the immense strides that model makers have taken to operate true scale models under working conditions have brought us vast quantities of really worthwhile material for publication which we have reluctantly thinned out to occupy the limited space at our disposal in our range of "general purpose" model magazines. Then we had the idea that perhaps the "scale model" side of our various hobby branches was large enough now to "hive off" into a separate publication, as we did years ago with RADIO MODELS and later MODEL CARS. From a thought to a scheme . . . now we are in the throes of presenting the trade with a practical dummy so that they can judge for themselves to what extent it meets their need. . . .

WHO WILL RUN IT?

Since so large a part of SCALE MODELS will necessarily be concerned with aircraft it is proper to give Ron Moulton, Editor of *Aeromodeller*, his full share of the credit for evolving it! With a mixed bag of models—aeroplanes, cars, boats, tanks, military vehicles, soldiers, even musical instruments—it will be desirable to have a panel of experts covering the various headings and this we intend to do, with Ron as their co-ordinating chairman. Later, if all goes well, it will undoubtedly be necessary to add to our permanent staff on the editorial side. (This is not an offer of work, but we *should* like to hear of some young enthusiasts interested in us with specialist knowledge of AFV, tanks, military uniform against that day.)

HOW BIG?

Dare we say the sky's the limit so far as circulation is concerned! Initially a magazine of this sort should attract somewhere in the neighbourhood of 30,000 cash customers—which means that about 75,000 people will eagerly read or at least glance through the items which interest them each month. In physical size, we shall retain our standard magazine proportions of 9¾ in. deep by 7¼ in. wide, with 48 pages plus 4-page cover—cover picture, of course, in colour. Special issues and special offers will come bigger!

HOW MUCH?

With paper prices and everything else still climbing, we should be unwise to consider starting a paper at a lower figure than we could continue. We would propose therefore to give the readers good value and sell at 3/-. (This will be the tidy sum of 15NP very shortly.)

WHEN?

If the demand is there—and all indications so far is that it is—then we shall start in the late summer with an October dated issue to appear in mid-September.

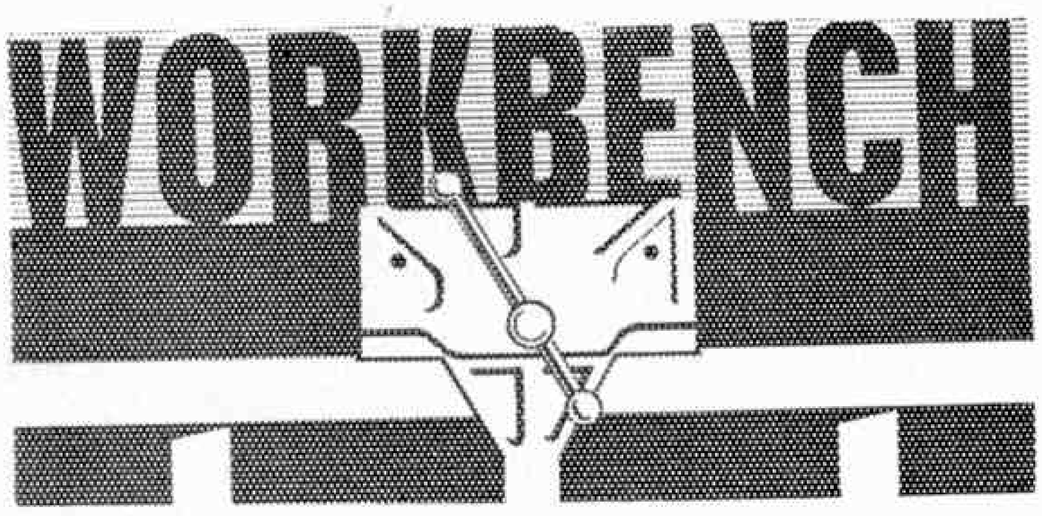
To M.A.P. Ltd., 13/35 Bridge St., Hemel Hempstead, Herts.

Please send me more about SCALE MODELS and your questionnaire.

NAME.....

ADDRESS .....

.....



Slaughter of animals is unavoidable; cattle must be killed for food; vermin, such as rats, killed to preserve vital crops. Foxes, attractive though they may be, create havoc with poultry and therefore their numbers must be kept down. The slaughter of some wild animals is essential for often very different reasons. Scarcity of food supplies can mean slow starvation for some; and the hunter's bullet can quickly prevent what could prove to be a painful death. This " mercy killing " is also applied to animals suffering from incurable diseases. To kill animals for their furs or skins is to my mind tragic. To kill for " sport " unforgivable.

Last year, due mainly to the efforts of a prominent newspaper, public attention was drawn to the terrible slaughter of young seals in Canada for their coats. Now thanks to the efforts of the public, laws have been passed to restrict further killing, and a strict watch is kept on the numbers killed to ensure that the seal population is kept at a healthy figure.

These events may seem remote to us here in Britain, but now one of our own animals, the Otter, is in danger of becoming extinct. Below is an extract from a report received the other day from " Wildlife," The British National Appeal of the World Wildlife Fund.

The threat of extinction

Otters are in danger almost everywhere. In Britain the otter population is decreasing. It has been unjustifiably regarded as vermin, has suffered from the effect of river pollution, has been hunted for sport and has been killed for its fur.

The Fauna Preservation Society and The International Union for Conservation of Nature are both concerned to prevent the extinction of species, and have various proposals for improving the survival prospects of these threatened otters.

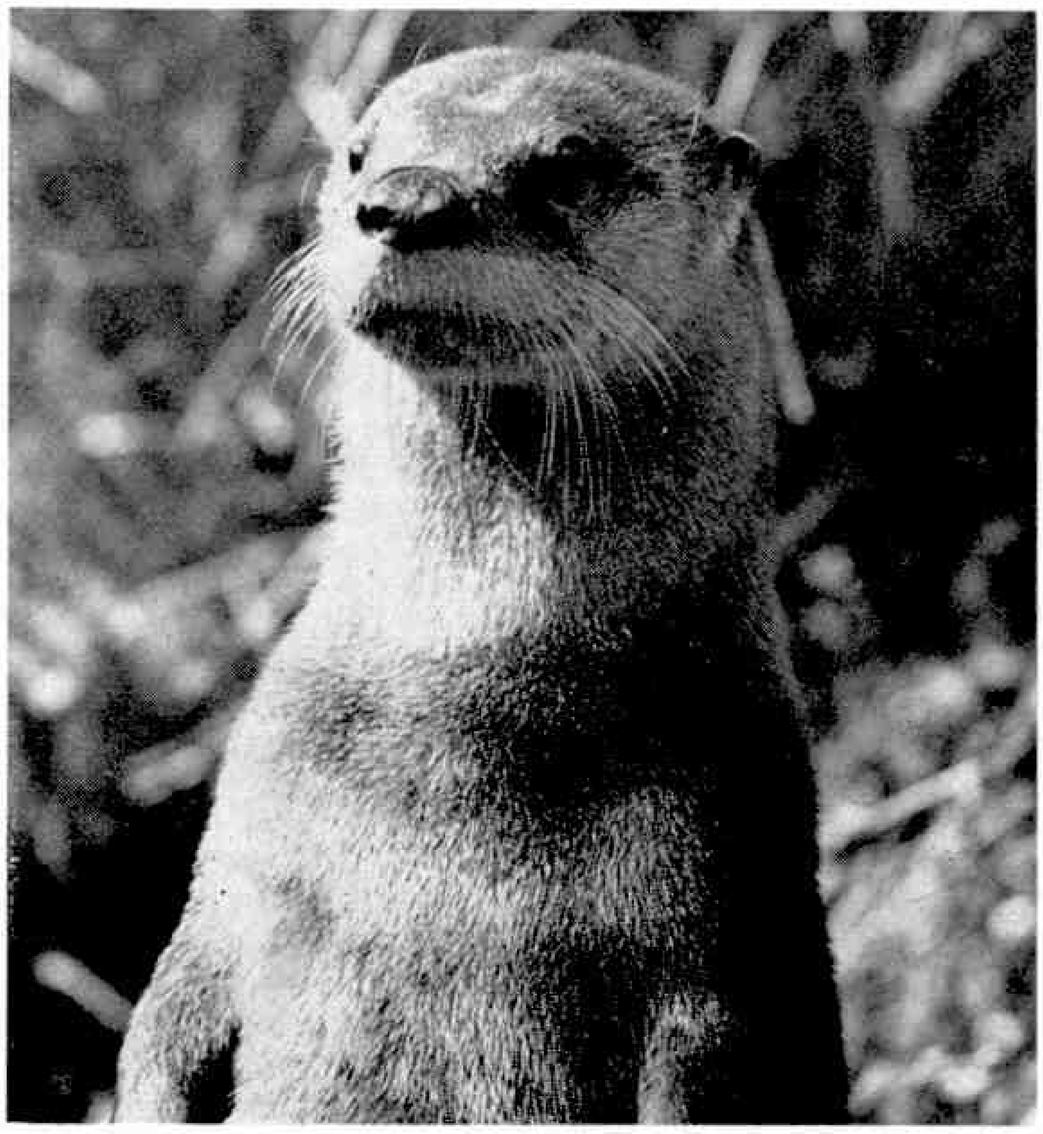
The Mammal Society's Interim Report, presented in February 1969, showed a fall in the total British otter population over the past ten years, and a particularly severe fall over the greater part of southern and eastern England. Contributory causes are listed as: the severe winter of 1962/3; pollution due to pesticides and industrial wastes; increased tourism and pleasure boating, fishing and high river rents; trapping (due to the high value of uncured pelts); and drainage and destruction of habitat.

As a result of this report, the Masters of Otterhounds Association decided to halt otter hunting completely for three seasons in the East Riding of Yorkshire and on North Humberside and fifteen rivers in south and east England. In addition, no kills will be made, except of sick or maimed otters, in any other part of Lincolnshire or south-east England.

The remedies proposed by the Mammal Society to meet the situation their report discloses, are a scientific effort to identify more conclusively the causes of the otter's decline in Britain, and a further, more detailed survey in three or five years' time. Wildlife and The Fauna Preservation Society agree that the hunting 'armistice' should be used for further research and in particular to settle certain contentious questions about otter hunting—for instance, the claim that otter hunting makes an effective contribution to conserving the otter by preventing indiscriminate destruction by trap or gun.

Wildlife and The Fauna Preservation Society also suggest the following practical steps to prevent further decline in the number of British otters:

1. The creation of special otter reserves on certain rivers, perhaps including experiments in re-stocking.
2. Further and more determined efforts to eliminate water pollution and purify our rivers.
3. Legislative protection for the otter.
4. Further curtailment or abandonment of otter hunting, preferably by voluntary agreement.
5. Curtailment of the use of otter skins (and other wild mammal skins) as " fun-furs " at the whim of the dictators of international fashion.
6. Extensive measures to educate the rising generation to a proper understanding of the valuable ecological role of the otter as a predator.



This handsome young otter is MIJBIL, star of the film " Ring of Bright Water " adapted from the book by Gavin Maxwell. (See Recommended Reading next month).

Midlands Meccano Guild Notice

Building Instructions and sets of photographs for the two Guild Super models mentioned in 'Workbench' of February *Meccano Magazine* were quickly exhausted by an unexpectedly overwhelming demand from Meccano enthusiasts. Fresh supplies have now been prepared and those readers who were disappointed or missed the February announcement should write to B. N. Love, Hon. Sec., Midlands Meccano Guild, 61 Sotham Road, Hall Green, Birmingham 28 for particulars, enclosing a foolscap s.a.e. Overseas readers should enclose an international reply coupon only.

H.R.C. to Live Again

This time the initials will stand for Hornby Railway Collectors with the approval of Meccano Ltd. Will anyone interested in joining such an association please send an s.a.e. to Peter Randal at 71 Foster Hill Road, Bedford.

THERE SHE BLOWS!

by TERENCE WISE

Modern diesel powered vessels are equipped with the latest devices to make modern whaling a highly sophisticated industry

"BLAST!" CAME the cry from the crow's nest. Seconds later the 450 ton whale catcher cleaved through the rough Antarctic sea at eighteen knots towards the pod of three fin whales that had been sighted, sheets of icy spray making the men on the bridge duck behind the wind deflectors.

As the catcher closed in, the whales began to dive nervously, sending up misty clouds of exhaled air each time they surfaced. The gunner went down the cat-walk from bridge to gun platform at a shambling run as the catcher corkscrewed through the waves. Spray swept over him constantly, at times completely covering him.

The whales dived and the catcher hung back, waiting to pounce. They breached to port and the catcher closed the range swiftly, the whole vessel vibrating. The gunner, legs braced wide apart on the heaving platform, swung the heavy gun round. The whales arched their backs for a deep dive to safety. One, two went down. The third was showing only a humped back, topped by the dorsal fin, when the gunner fired. A cloud of spray seemed to indicate the harpoon had fallen short, but three seconds later there was a muffled thump as the ten pound fragmentation grenade on the end of the harpoon exploded.

The nylon line shrieked through the blocks as the whale sounded and for the next few minutes the Chief Engineer juggled with the controls of the big steam winch as the fin took out line, stopped, then rushed for the surface. He had to be quick—the rope had a breaking strain of thirteen tons, the whale weighed about seventy!

The fin burst to the surface to take in air for yet another dive. Incredibly swiftly the catcher was there and at a range of only twenty yards the gunner shot home a killer bar—a harpoon and grenade without a line attached. Slowly the huge whale rolled over to show its white belly.

The whale was immediately pumped up with compressed air to prevent it sinking, a wire strop was passed round the tail for towing and the tail flukes were sliced off to prevent it 'swimming' away with the motion of the sea. A flag pole was jabbed into the body, a radio buoy attached that would emit a constant radio beam, the catcher's number was etched on the skin and then the catcher moved off to continue the chase. Soon a buoy boat would beam in on the radio buoy, collect the carcase and tow it back to the factory ship.

Later the whale was hauled aboard the 16,000 ton mother ship through the hole in her stern. Men with six foot long flensing knives removed the blubber in great glistening strips and passed the carcase to the fore plan where the head and jaw were detached and cut up by a steam-driven saw. Next the carcase was split in half, the four ton fillets of back meat peeled off, then the belly meat, the ribs and backbone were sawn into segments and heaved into the steaming pot holes in the deck, and the intestines—except for the liver which is rich in vitamin A—were dumped over the side.

In half an hour the seventy ton whale had disappeared and another taken its place. Working flat out these men can 'work up' a whale every half hour, with the deck clouded by steam and smoke, and criss crossed by a dozen dangerous wires.

Our heading photograph shows a whale being hauled up the ramp of a Norwegian factory ship.

Left: Loading the harpoon gun. The grenade has not yet been screwed on.

Right: This picture clearly shows the high bows and cat-walk of a catcher. The gun has just been fired.

On the factory deck below, mincing machines, separators, driers and boilers were busily engaged in breaking down the raw materials to produce blubber oil for soap and margarine, meat and bone fertiliser nutritious meat and liver extracts, and frozen meat for animal foods. (The Japanese use this meat for human consumption.) Once we dealt with an eighty-eight-foot blue whale that yielded thirty-five tons of oil, twenty-four tons of frozen meat, five tons of meat meal and half a ton of meat extract. Total value—£5,308 !

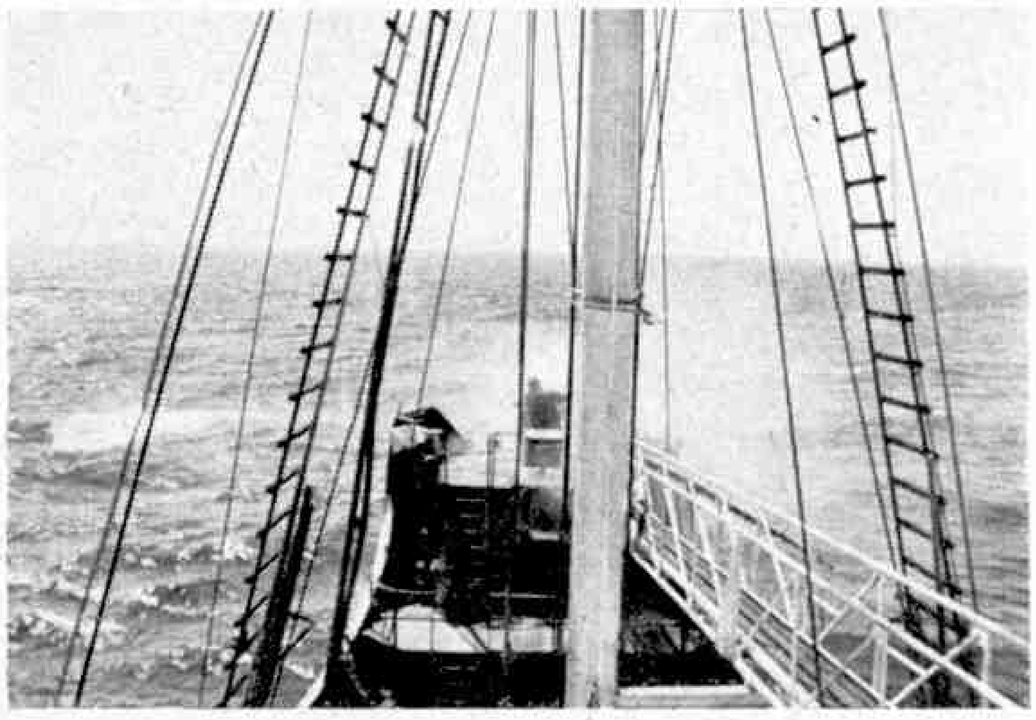
But not all hunts end so easily as the one described above. In 1947 the catcher *Simbra* capsized after harpooning a blue whale. Seven of the sixteen crew reached the ship's boat but when they were found, twelve hours later, six of them were frozen to death. In 1954 the catcher *Kos* 45 harpooned a big sperm whale, only to become the hunted herself ! The whale charged the catcher, ramming her stern so forcibly that one propeller blade snapped off and another was badly bent. On 31st December 1958, the mate of *Setter* 5 was washed overboard: in those freezing seas he could not have survived more than a few minutes.

His body was never found. Later that season the same expedition lost two more men overboard.

Yet men still go down the Antarctic to hunt the whale. If you ask them why they would answer with a laugh, " the money ! " But my own wages averaged only £16 a week after deductions, though this does not allow for free food and board. It is not the money ! They go because they must, enduring hardship and boredom gladly—in exchange for the unknown, for in the Antarctic no one knows what might happen next.

They sign on in October and sign off again in April, spending four or even five months in the whaling grounds. Once we were at sea for 131 days without sighting land. Down the ice they live four to a tiny cabin, shut in because of the rough seas, living mainly on dried fish, salt pork and beef, potatoes and coffee. In the season they work twelve hours on, twelve hours off, seven days a week, week after week. While there are whales they work; when there are no whales they fret irritably and suffer from ' whale sickness.'

In the Antarctic there is no rain but it usually snows for several hours each day, starting around three in the morning. Ice forms on the rigging, the wind tries to

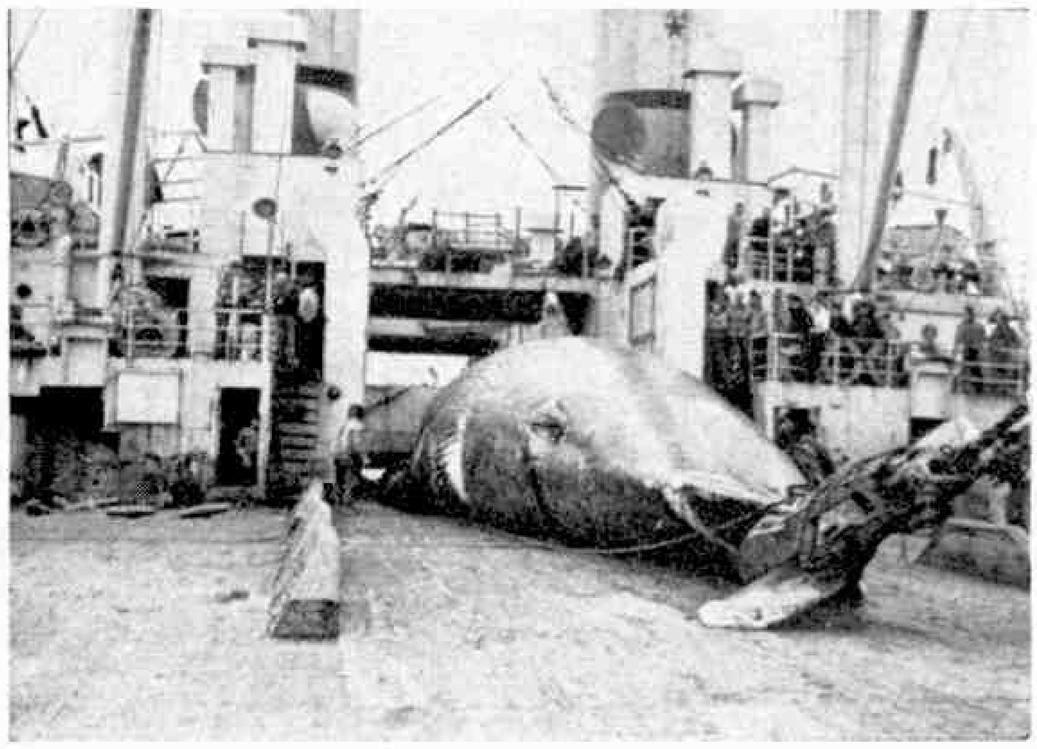


push you overboard and without warning the sea rises to soak you in freezing spray. Most weeks there is a violent storm and later in the season the sea-ice begins to form, growling along the ship's sides. But dawn is a kaleidoscope of colour and the sun on the ice formations is like something from a Walt Disney fantasy.

Ten years ago twenty-one expeditions went down the ice: 11 Norwegian, 3 British, 1 Dutch, 2 Russian and 4 Japanese, Now only one Norwegian, two Russian and three Japanese ships remain and in the autumn of 1968 the Norwegian firm announced their ship would not go south—they still have not sold the oil produced the previous season.

Direction finders, ultrasonic whale finders, asdic, radar, helicopters and diesel-powered catchers have hunted the Antarctic whales to the point where, despite international restrictions, they are almost extinct. In the late 1920's there were an estimated 100,000 blue whales; today the figure is under 600. This caused increased hunting of the fin whale, which in the last twenty years has decreased from 200,000 to 35,000. Nowadays the whalers are forced to hunt the sei whale, only half the size of the fin.

With the decline of the Antarctic whaling, attention is focussing once again on the sperm fishing in tropical waters, largely neglected since the days of Moby Dick. Yet even here, modern methods will soon exhaust the supply, and it is now essential that strict control of all whale hunting is imposed. If we continue the way we are at present, the whale will eventually become as dead as the dinosaur and take with it into oblivion all its great food potential.



Above: A catcher coming along side to refuel.

Right: A giant blue whale on the after-plan. The twin funnels are a characteristic of all factory ships.

A *Grumman Goose,* **Fish and Wildlife Service plane, tied up at Yellowknife, Canada.**

AIRBORNE CHECK ON NATURE

by I. S. Balderstone

Re-produced by courtesy of B.P. Ltd.

A VOICE recorder and a survival pack are essential items of gear on board the aircraft of the United States Fish and Wildlife Service. These aircraft scout the vast expanses of Canada and Alaska in annual waterfowl breeding surveys. So far, the survival kits have remained unused in the seat-wells; the voice recorders, however, are used hour after hour, making it possible for crews to list everything they see without taking their eyes from their " targets."

Aerial photography is also used for census of fish and wildlife, the equipment consisting usually of the tried and trusty K-22 or K-17 aerial camera on a ring mount in the floor of a twin-engined Beechcraft. For routine work the camera is equipped with a 12-inch lens and normally a yellow haze filter is used, depending, of course, on light conditions. Satisfactory pictures for bird counts are taken at altitudes between about 700 and 1,800 feet at speeds of 120 to 160 mph. Below 700 ft., subjects tend to blur; above 1,800 ft., enlargement may be required for accurate counts.

A hand-held K-20 camera—well known to crews of RAF Coastal Command—is used frequently to photograph big game or small concentrations of waterfowl. Species of big game photographed by this method include deer, antelope, North American elk, moose and caribou.

The Americans and Canadians co-operate closely in making annual aerial photographic counts of Pacific Salmon redds and live fish in the Columbia, Salmon and Snake Rivers, and also in the Sacramento and Rogue Rivers in California and Oregon respectively.

A herd of Antelope photographed on the Sheldon National Wildlife Refuge, Vya, Nevada.

The advantages of aerial photography for this unusual work can be summarised as follows:

1. The degree of accuracy in making population estimates is far greater than in those made by ground surveys.

2. The technique of picture taking is more quickly assimilated than the skill needed for accurate on-the-ground counting.

3. Photographs can be retained as permanent records and made available to a wide cross-section of agencies.

4. The cost of aerial photography, and of counting animals from the photographs, is lower than the cost of on-the-ground counts.

One of the limiting factors of aerial photography is, on the other hand, that the area to be photographed must be relatively open and free from shadow-casting items, such as tall trees, and sharp topographic changes.

A waterfowl breeding ground survey is a carefully planned operation. Some 400 Wildlife experts from Canada and the United States participate, and they cover all of the important waterfowl nesting areas in Canada, Alaska and about 30 American continental states. Air and ground crews take part, each with a definite task. The aerial surveys follow previously established parallel lines, and in areas where the breeding birds are concentrated the aerial transects cover large portions of some states and provinces at intervals of from 7 to 12 miles. In other locations the intervals are extended to about 60 miles apart.

There are two men in each aircraft—pilot and observer. Accurate track keeping is essential. Any error in the sample surveys is reflected and magnified in the completed job. The aircraft is flown 200 ft. above the ground and at the slowest speed consistent with safety. Both the pilot and the observer count birds, each covering a strip of about 220 yards on his own side of the aircraft. The voice recorder is used to list information rapidly without distraction. This is of particular importance, for the pilot must give constant attention to the ground ahead when flying at such low levels.

Although Fish and Wildlife Service aircraft have covered the remote areas of Northern Canada each summer since 1947, and have flown nearly a million miles doing so, there have been no forced landings necessitating search and rescue. Engine trouble has delayed flights on occasions, and adverse weather has forced aircraft to put down on remote lakes to await better conditions, but in every case aircraft and crews have reached their destination " under their own steam." However, the aircraft are equipped for emergencies, the survival pack being only part of the material carried . . . " just in case." In one Beechcraft in which the writer flew over Northern Canada,

tents, bedding, guns, fishing tackle and plenty of emergency rations were to be seen stowed around the aircraft.

The survey itself is not intended to determine the actual number of birds, but aims to provide comparative data from year to year. Since identical tracks are flown each year, usually by the same crew, population comparisons become possible. Subsequent flight and hunting records indicate that the surveys do the job they are designed to do.

During the period when the U.S. Fish and Wildlife Service managed the salmon resources of Alaska, aircraft were used extensively to make estimates of numbers of salmon on the spawning grounds. Much of this work has been continued by the Alaska Department of Fish and Game since Alaska assumed responsibility for the fisheries resources in 1959.

Important factors in evaluating aerial surveys of spawning salmon include:

1. Differences in timing of spawning migration from area to area from year to year.
2. Differences in distribution of spawning salmon among areas from year to year.
3. Variations in visibility due to weather or water conditions.
4. Differences in experience of the observer or pilot from year to year.

Actual fish-by-fish counting by field parties is still the most accurate method of census taking and, indeed, is the only feasible method for streams which are heavily overgrown by timber or brush, or which have types of bottom into which the fish blend closely. Accuracy decreases rapidly, however, when fiish are densely schooled, or when spawning occurs along beaches where observation is difficult and estimates of numbers have to be made. Another consideration is that an inordinate number of personnel is needed to cover on the ground more than a few streams at the limited period of peak abundance. Various sampling methods tried in other areas have provided less accuracy, yet have still demanded large numbers of personnel, at pronibitive cost, even when the work has been combined with other activities.

In order to provide year-to-year control, airborne estimates have been accompanied by ground counts on certain key streams in each watershed. This does not imply that aerial observation is a casual guessing of numbers. The aircraft must be flown at a constant altitude above the stream—generally between 600 and 800 ft.—so positioned that the observer is between the sun and the objective to avoid glare. In approaching a group of fish, the observer usually counts 10 individual fish, then mentally connects 10 such groups into a block of 100, finally dividing the entire school into such blocks, tallying the individual hundreds on a hand counter.

It is not uncommon for an observer to see as many as 300,000 salmon in a single day's operation: a land count of this magnitude would take several weeks. If the fish are numerous and grouping is close, the aircraft must be held in a constant turn (through at least 720°) centred on the group. Considerable skill and concentration is required both by the pilot and observer. Fatigue becomes an important factor after a few hours of such work.

Training flights, in which the observer estimates groups of spawners of known size, develop skill and accuracy in observation, teamwork between pilot and observer, and proper selection of altitude and direction of flight in accordance with conditions of reflected light and glare. The counts made by ground parties provide a check by means of which the tendencies of various

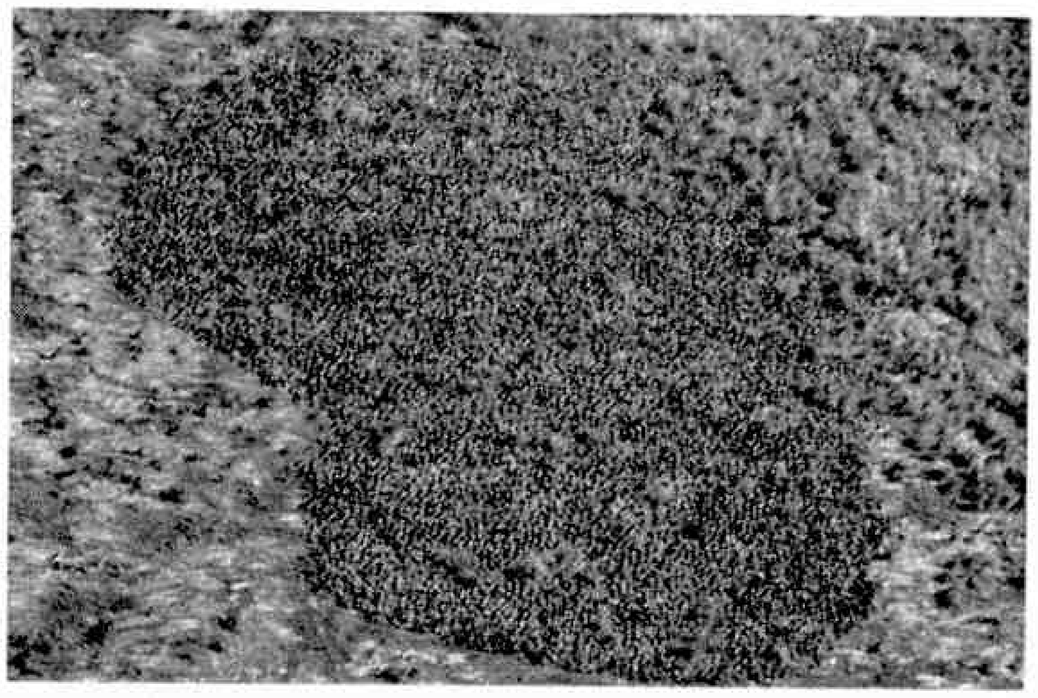
A group of seals perched precariously on a cliff face are photographed by a low flying aircraft similar to the one on the opposite page.

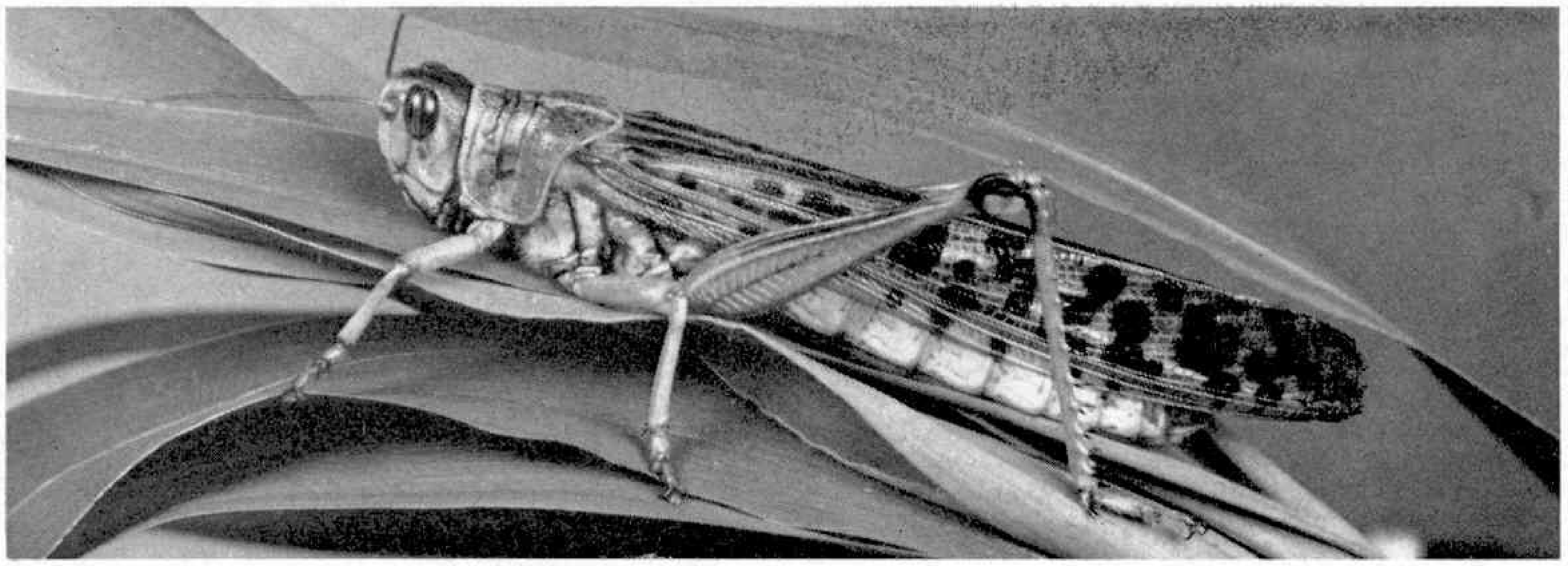
observers to estimate above or below actual numbers may be determined.

Photographing salmon for later counting is a much more complex procedure than visual counting, and for this reason more reliance is placed upon a visual count. On a photographic sortie the aircraft is flown at about 80 knots at an altitude between 500 and 1,000 ft. depending upon the width of the stream. To satisfy the high light demand of underwater photography, film with an index speed of 200 is used this being increased to 1,000 by use of special developer. One filter cannot be used for all situations: a gravel and sand bottom needs a yellow filter; one covered with vegetation requires a green filter, and to reduce reflections in deep water a polaroid filter has been found to give good results. Photo-interpretation is carried out by trained personnel who achieve extremely accurate counts, utilising a gridded plastic sheet which is laid over the photograph.

An occasional and unusual job involves "planting" beavers in areas difficult to reach by land routes. The animals are parachuted down in special containers which open automatically on contact with the ground. The beavers then set about building dams—which are of great value in preventing soil erosion and flooding—and multiplying. The more beavers there are the more dams will be built—quite a change from Parkinson!

A flock of Pintails, photographed at the Sacramentso National Wildlife Refuge, California.





WAGING WAR ON LOCUSTS

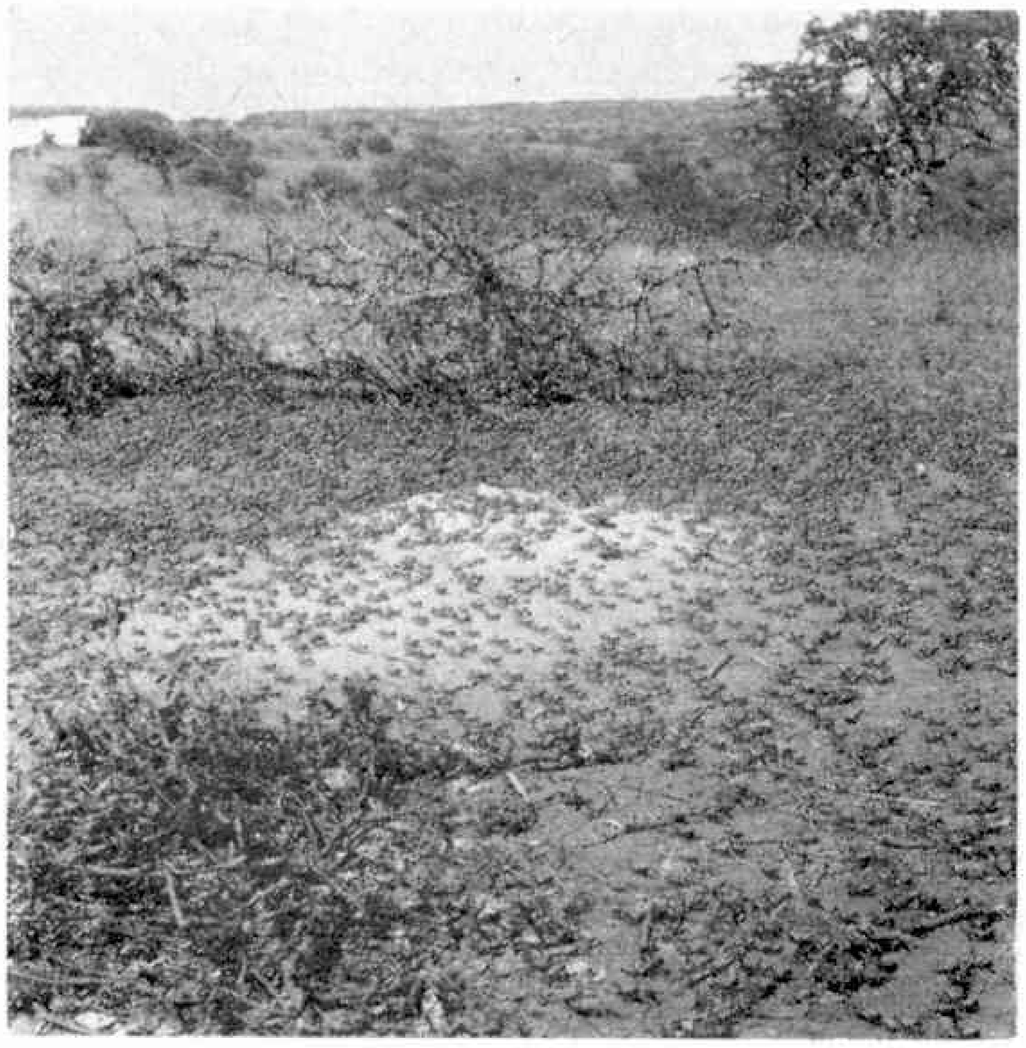
The story of man's efforts to exterminate the world's greatest pest

by T. HOLLOWAY

FROM THE time when man first became a farmer more than 9,000 years ago, he has faced grim competition from the locust in the battle for survival over vast areas of the earth's surface. Ironically, these gregarious flying grasshoppers attack food crops in those areas of the world where man's struggle for survival is most acute.

Heading photograph shows a young male Desert Locust.

Below: Fourth and fifth stage hoppers of the Desert Locust "On the march".



The Desert Locust presents the gravest problem, for it is a migratory species which affects over 60 countries and territories in Africa and South-West Asia, an area of more than nine million square miles. A single swarm of medium size may comprise some 1,000 million individuals. Each insect consumes its own weight (about 3 grams) of green vegetation daily, thus a medium swarm must consume 3,000 tons of food daily to maintain itself.

During its six months of life, a Desert Locust travels between 2,000 and 3,000 miles, breeding as it goes, with the females depositing their eggs at weekly or fortnightly intervals at spots where and when conditions for hatching are favourable. Thus, there are no compact or well-defined breeding areas where continuous and systematic control measures can be conveniently taken. A female will lay at least 300 eggs in her lifetime, so the immensity of the control problem is easily understood.

It has been estimated that the cost of locust damage throughout the world exceeds £50 million annually. Hunger and death from starvation can follow in the wake of an invasion by the hungry enemy. The seriousness of these invasions will be appreciated by the fact that 167,000 tons of cereal crops, worth more than 20 million dollars, were destroyed in Ethiopia in a single summer. This damage represented a loss of a year's food supply for over a million people.

How does man fare in the war against locusts today? Without suggesting the speedy capitulation of "man's oldest enemy," it can be stated that prospects of ultimate victory have never been brighter. The enemy has already given ground in a number of regions; and long-term research, plus modern weapons, are turning the tide of the struggle in man's favour. Quite frankly, the locust has never had it so bad.

A spokesman of the Anti-Locust Research Centre in London, nerve-centre of the world's war against

"the hungry enemy", summed up the situation thus: "There is now reason to hope that large-scale locust plagues may in future be prevented if constant vigilance is maintained and control measures are rapidly applied on the first signs of excessive breeding."

Life-cycle of the Desert Locust

The life-cycle of the Desert Locust consists of three phases: egg; nymph or hopper (of which there are five stages, known as instars); and adult. It breeds in the desert, and yet needs rain and vegetation for hatching the eggs and feeding the hopper.

The female locust, having found the damp soil or sand she needs, lays her eggs. Each pod of 50 to 100 eggs is deposited in a hole two or three inches deep, which the female locust makes by thrusting the rear end of her abdomen (which is hard) into the ground. In from ten to twenty days, usually after rain, the eggs hatch.

Hatchings wriggle their way to the surface, shed their first skin and become first instar hoppers. They begin to feed within 24 hours.

It seems that if locusts have adequate living space they will not swarm and migrate but will remain in the solitary phase, living, breeding and dying near their birth-place. But if living conditions are crowded, swarming *will* take place.

When a mass of hoppers decide to swarm and seek pastures new, a phenomenon peculiar to Locusts occurs. The hoppers assume a different colour from the solitary

specimens, a striking pattern of yellow (or orange) and black. The solitary hoppers are usually green.

The swarming hoppers form into long columns comprising anything up to hundreds of millions of individuals. The columns begin to march, small bands merge to form larger ones, and all head in one direction. Movement is not extensive and does not usually exceed two miles from the hatching ground. Nevertheless, many thousands of hatching grounds may be spread over a very wide area.

Movement and feeding continue for about thirty days after hatching, during which time the hoppers pass through five instars, or stages of growth, casting their skins between each.

For several days after the individuals have become adults, the locust swarm takes short daily flights. These develop into a true migration of prolonged flights on successive days. Swarms may reach fantastic proportions—examples containing about one million *million* locusts and extending over 200 square miles have been recorded. These swarms often cover distances of up to 2,000 miles.

Above: A smiling face shows that in this area the locust has been wiped out.

Left: A swarm in full flight.

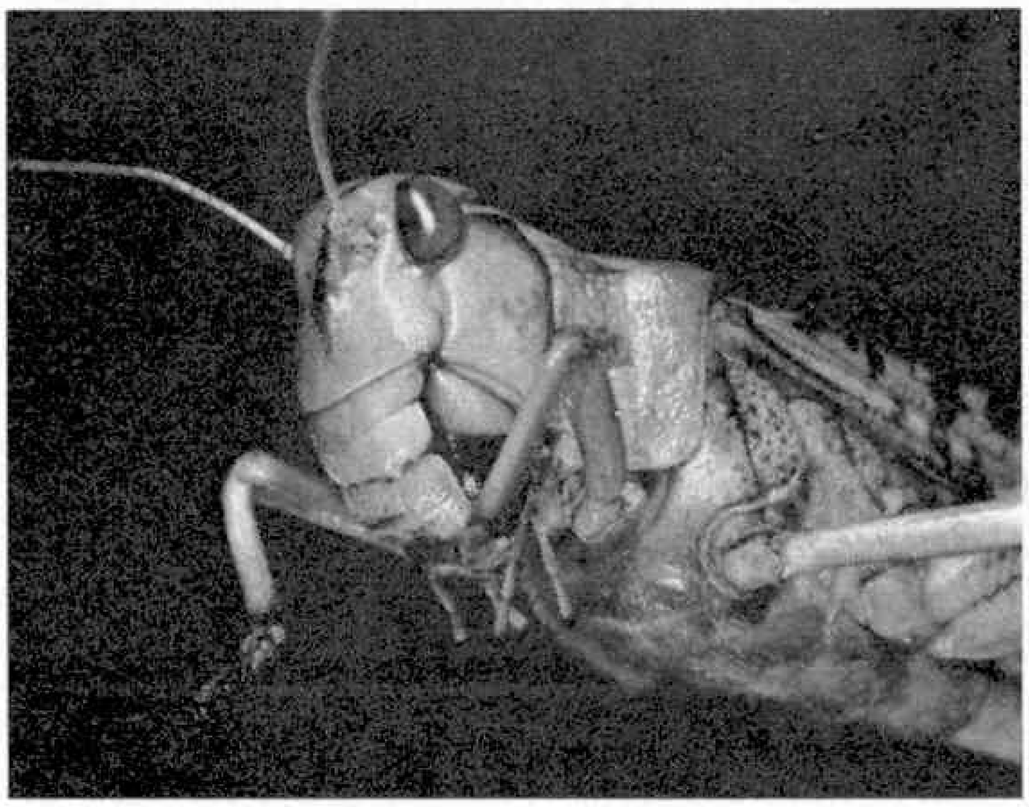
Below: A close-up view of a locust's head.

Weapons against the Locust

Primitive methods of fighting the locust were pathetically inadequate and usually consisted of beating adult or hopper swarms on the ground; digging trenches in the paths of marching hoppers in which to bury or burn them; erecting screens to deflect their march; and even beating tins and other noise-makers in an effort to scare off settled swarms.

Fortunately, scientists with the co-operation of the world's leading chemical firms, have succeeded in devising a range of effective and quick-acting stomach and contact insecticides which can give up to 100% kills. They are chiefly applied as liquids or dusts, or mixed with bran to provide a lethal bait.

Ideally, the most effective method of locust control



would be to spray the vegetation surrouding the egg-bed areas with an insecticide, so that the newly-hatched locust's first meal would be its last. Whenever possible this is done, but unfortunately a hatching area may comprise a great many egg-beds and their boundaries are not easy to locate.

Once the hoppers are on the move, however, spraying or baiting in the paths of the advancing hordes can practically wipe them out. It is vital that every effort is made to prevent the hoppers reaching the winged stage. In recent years, aircraft and helicopters have been used to good effect in locating the marching hopper bands.

Considerable success has also been achieved by aircraft fitted with specially-designed spray-bars flying above the winged swarms and spraying them with modern contact insecticides. Well-planned aerial spraying of vegetation in advance of the swarm can also take heavy toll of their numbers.

Work of the Anti-Locust Research Centre

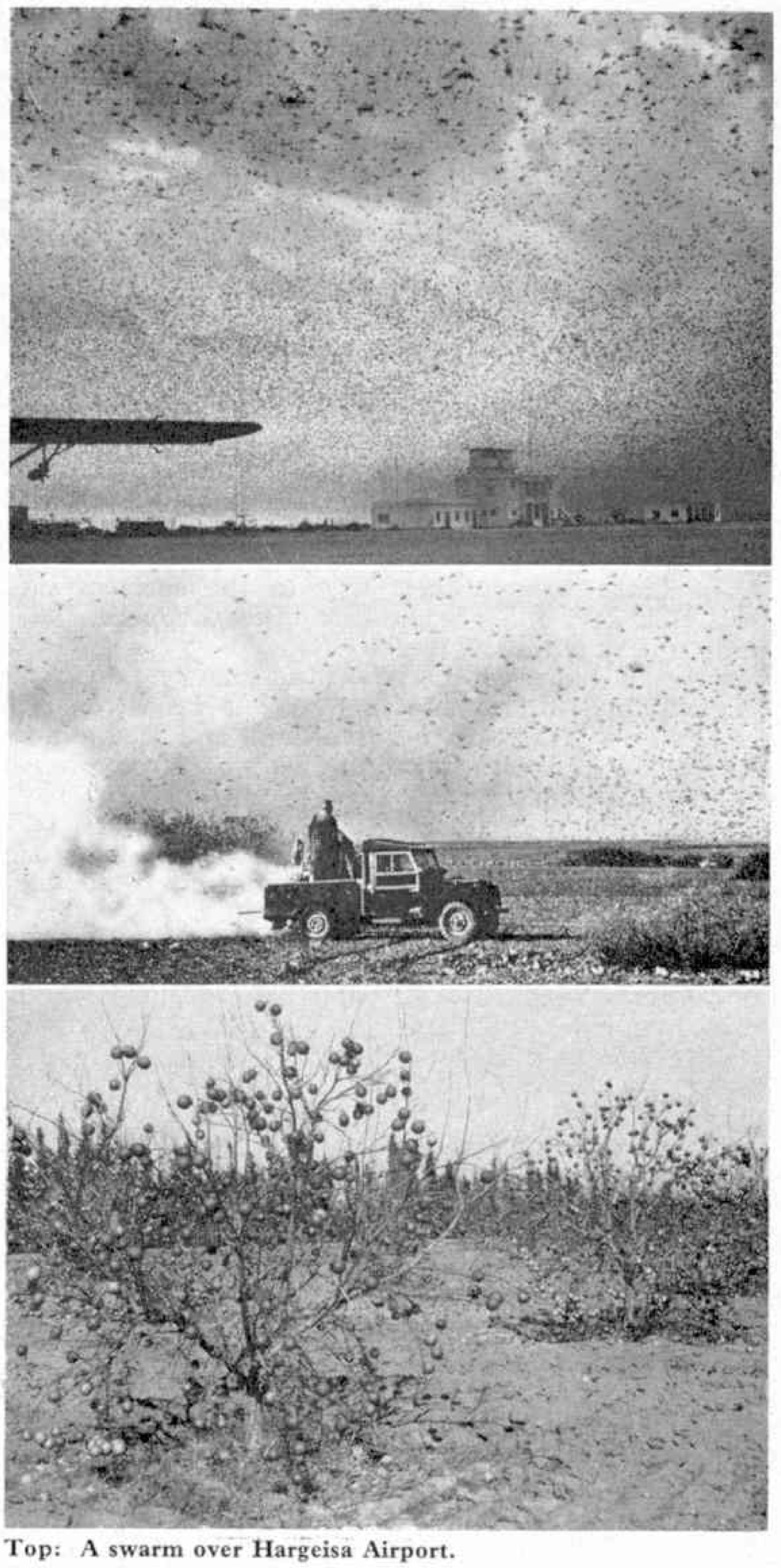
The Anti-Locust Research Centre in London, has become the nerve-centre of the world's war against locusts. Over a period of many years it has been collecting information on the occurrences and migrations of many species of locusts throughout the world. Daily reports on locust activity flow into the Centre. From information received, and by consulting previous records, the Centre is able to forecast with a high degree of accuracy when and where the enemy will strike next.

Each month a summary of the world locust situation, together with a forecast of expected developments, is sent to some 50 countries. In the event of unexpected or serious developments, the countries concerned are cabled immediately in order that the necessary precautions can be taken.

The Centre has five controlled temperature breeding rooms where thousands of locusts are reared for research purposes. Every aspect of the insect's life history and its environment are studied, and a mass of vital facts and figures has been built up.

The more land that is brought into cultivation. the better are the locust's chances of breeding. Today, when the great new dams on the Niger, the Nile, the Euphrates, the Indus and elsewhere promise a better standard of life for millions, it would be tragic if the locust should be allowed to take away what man has so hardly won.

This pile of dead locusts shows the effect of modern insecticides.
Photographs by courtesy of Shell, and the Desert Locust Survey.



Top: A swarm over Hargeisa Airport.
Centre: A Land Rover spraying poison on the ground ahead of a swarm.
Bottom: Only the oranges are left on these trees, but they will soon perish without leaves.

Victory over the locust demands 100% co-operation among the countries concerned. International anti-locust teams must be allowed to move freely and quickly across frontiers, with all the necessary ground equipment, air transport, insecticides and poison bait. It only needs one country to close its boundaries for political or military reasons to give the locust respite to build up its numbers and return to the fray like a giant refreshed.

After 9,000 years the "hungry enemy" appears to have lost the initiative. Today, we have the weapons and the know-how to bring the battle to a successful conclusion. Lack of co-operation in any one sector could be sufficient to tip the scales once more in the locust's favour and delay effective control for many years to come.

RADIO 4-2

An introduction to a brand new series, starting next month, on the construction of simple Radio Controlled models.

What is RADIO 4-2?

This is the code name for a new series of articles that will introduce simple inexpensive radio control of a variety of models to MECCANO MAGAZINE readers and will later be available as leaflets to help beginners.

Why call it RADIO 4-2?

Because it is primarily intended to appeal to a team of two persons (radio for two!) which will usually be a father/son or similar combination; and secondly to be introduced as a series of two part articles.

But isn't radio control frightfully expensive?

It need not be! You *can* spend hundreds of pounds, or you can, as we intend to show you produce a working radio control project complete for about £15. Later, if enthusiasm develops and funds permit, then you can get more ambitious.

We don't know a thing about electronics!

If you can tell right from left, and black from white, you should be able to cope.

And we've never made a model anything . . .

Don't worry! Whilst the keener people can make nearly everything, less expert operators can buy ready-to-fit parts at specially cheap "package-deal" prices which we are arranging.

NOW READ ON . . .

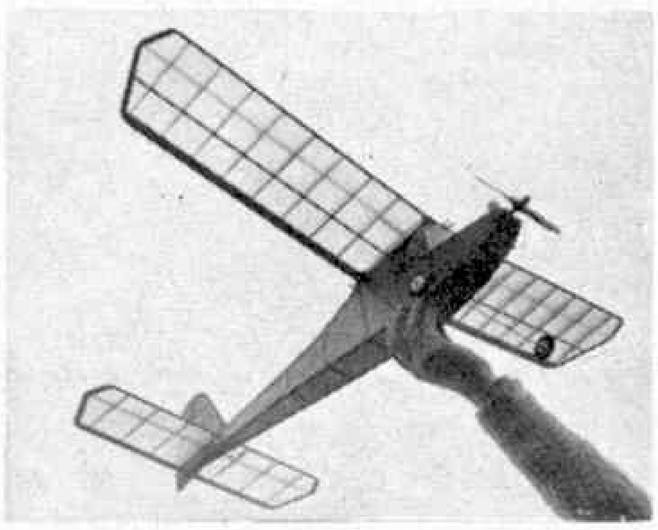
Starting in August issue of MECCANO MAGAZINE there will be a series of six *extra supplements* that put over the RADIO 4-2 project in a nutshell. Part I will cover introduction to very simple radio control for boats. It offers left/right rudder with the option of engine control. Power unit will be an electric motor with, providing a wooden hull is used, a small diesel engine. The scheme will be explained with tables showing available equipment of various makes and current prices. Diagrams will show exactly how to install radio equipment in the boat, and how to test and use it. Then in Part 2 (September issue), comes a drawing for the boat (a $22\frac{1}{2}$ in. long hull with choice of superstructures) with step-by-step instructions for building. You can make it all, or a ready-to-use hull will be available for a few shillings.

Continuing the story, Part 3 in October deals with radio installation in a model aeroplane. Again tables of equipment readily obtainable with prices, details of how to fit and operate. Everything made absolutely clear to the veriest beginner—so step in bravely! Part 4 in November issue provides the fullsize working drawing to make a suitable good looking, reliable aeroplane that you can fly by radio control. Again there will be specially provided parts to help in the work at a MECCANO MAGAZINE readers' special price.

Part 5 in December issue will deal with radio for a model car. All the step-by-step information will be provided for installation and operation of equipment based on a typical "racing car" outline. Part 6 to end the first series will have the working drawing of the playground Grand Prix car. A similar "package deal" will assist in providing parts and body for those who would rather have ready made—or you can do the lot yourself.

This series has involved us in a lot of thought and a great deal of "shopping around" but we are confident the great breakthrough in radio control modelling is upon us. Price has been the stumbling block, and too many would-be enthusiasts have been put off by the belief that it was wildly expensive. *This just isn't true!* For £15 all in (or at the most £20 which gives quite a range of equipment choice) you can have a boat on the water, a plane in the air or a car on the track and working under your control. Boats, cars, planes, all have their special problems and treatments but join in RADIO 4-2 and be amongst the "in" people . . . we shall be providing special RADIO 4-2 transfers for your models, lapel badges and will have competitions organised to show off your new skills!

Starting August MECCANO MAGAZINE on sale July 16th . . . from your usual supplier or send 2/10d. to M.A.P. Ltd., 13/35 Bridge Street, Hemel Hempstead, Herts.



AIR NEWS

John W. R. Taylor
describes

Ejector Seats
Radar Achievements
Home-built Aircraft

Mr. Ward's home-built record-breaker

While Boeing and Lockheed have been busy building the world's biggest transport aircraft in America, an Englishman has produced what is probably the smallest aeroplane now flying anywhere in the world. Known as the Gnome, it spans just 15 ft. 9 in., is 11 ft. 9 in. long and weighs 210 lb. Its Douglas horizontally-opposed two-cylinder engine was manufactured in 1925 and develops less than 14 h.p.

Mr. Michael Ward, who designed and built the Gnome in a garden shed measuring 8 ft. 6 in. × 6 ft. 6 in., is a joiner living in North Scarle, Lincolnshire. Having been a keen aero-modeller all his life, he decided to try something a little bigger, without going to the expense of using approved aircraft materials and the usual costly aero-engines. As it is not built to aircraft standards, the Gnome cannot be properly registered and is limited to short flights at a height of 10 ft. above the ground; but it handles well and has a top speed of 55 m.p.h.

There have been one or two smaller aircraft in the past, but they were freaks and, in any case, could not match the light weight and low power of the Gnome.

Smallest of all those which left the ground was the American Stits Sky Baby biplane of 1952, which spanned a mere 7 ft. 2 in., but had an 85 h.p. Continental aero-engine and weighed 452 lb. Despite its alarming appearance, it was demonstrated successfully at air shows by its designer, Ray Stits, and had a top speed of 185 m.p.h.

Four years earlier, Stits had built a tiny monoplane known as the Junior, with a span of 8 ft. 10 in. and weight of 393 lb. This, too, was quite fast, achieving 175 m.p.h. on the power of an 85 h.p. Continental; but, like the Sky Baby, it landed at around 60 m.p.h. and was really too "hot" for anyone but a skilled pilot to handle.

Another American lightweight of 1948 vintage was the Beecraft Wee Bee, described at the time as being just big enough to lift a man and yet able to be lifted by a man. It was designed and built by four employees of the Convair company at a cost of £71. Powered by an 18½ h.p. engine, it spanned 15 ft. and weighed only 170 lb. There was no cockpit. Instead, the pilot (wearing a parachute!) lay on his stomach above the flat-topped fuselage and operated the controls through hand-holes in the decking.

The modern successor to the Wee Bee is the far more practical Volksplane, also built by a Convair design engineer, named Samuel Evans. He set out to produce an all-wooden single-seater that even a

novice would find easy to construct and safe to fly. Three years of spare-time work went into the prototype, and initial flight trials have proved very promising.

The box-like fuselage of the Volksplane consists simply of three bulkheads, four longerons and plywood skin, without any of the usual diagonal bracing. The fabric-covered wooden wings are built around two rectangular spar beams, with internal wooden compression struts and diagonal wire bracing to avoid the need for complicated box-spars. There are no flaps and the tail unit consists of one-piece all-moving vertical and horizontal surfaces, like that of some of the latest and fastest military aircraft.

As its name implies, the Volksplane is powered by a 40 h.p. converted Volkswagon motor-car engine. It spans 24 ft., is 18 ft. long and weighs 440 lb. Take-off run is a mere 150 yards in an average breeze; it can be dived safely at 120 m.p.h. and stalls at only 46 m.p.h. Few aeroplanes ever built could better such all-round performance and, at the same time, offer do-it-yourself construction. We should, therefore, hear quite a lot of the Volksplane in the years ahead.

Will our own Mr. Ward be able to offer it some healthy competition on this side of the Atlantic? We must wait and see. All that I can tell you at the moment is that the success of the Gnome has encouraged him to start work on another aeroplane, built of aircraft-standard materials.

Aerial " lifeboat " for combat pilots

In spite of the wonderful achievements of U.S. rescue aircraft and helicopters, some of the American aircrews shot down in Vietnam inevitably fell into enemy hands. To reduce such losses, the Kaman company is developing for the U.S. Navy a remarkable new type of ejection seat that turns into a self-propelled aerial " lifeboat " after it has been shot clear of a crippled aeroplane.

The seat is known as Saver (Stowable Aircrew Vehicle Escape Rotoseat). In the aircraft it looks like a normal ejection seat, but it has a set of stowable and telescoping rotor blades, a tail stabiliser and a turbofan engine and controls built into it.

Less than half a second after the pilot fires the seat, it rockets clear of the cockpit. After one second a drogue parachute opens and begins to unfold the two-blade rotor. Within two seconds this rotor is fully deployed; two seconds later, with the tail unit extended and the rotor spinning freely in the airflow, the Saver begins gliding through the air as a rotor-kite. Six seconds after firing the seat, the pilot starts up the turbofan engine, turning the device into a powered autogyro capable of flying 60 miles at a speed of 115 m.p.h. Having reached friendly territory, the pilot can either glide down to a pinpoint landing or, if he prefers, leave the seat and make a normal parachute descent.

Saver's weight, without pilot, is 345 lb., and its

baby turbofan generates 275 lb. of thrust. If built and incorporated into combat aircraft like the A-7 Corsair II and F-4 Phantom II, it will be capable of safe operation at any height above 1,000 ft. Equipment built into it will include automatic flight and homing systems, an automatic locator beacon and survival kits.

Radar saves 4,097, traps one

Forty minutes of near-panic for a woman pilot ended with an almost-routine touch-down thanks to the calm efficiency of a radar controller in the tower at Phoenix, Arizona. He guided her down safely despite two near spins, after she had radioed " visibility nil " while lost in storm clouds.

This was only one of 4,097 flight assists, or " saves ", logged by Federal Aviation Administration air traffic controllers during 1968. Most of the incidents involved lost pilots, some with more than one problem. Take the case of the pilot who radioed one night to the FAA flight service station at Du Bois, Pennsylvania, to report that he was lost, low on fuel and caught in marginal weather with all of his navigation equipment out of action, as well as all of his instrument lights. The pilot was told to find a town, circle it and call out prominent landmarks. In this manner, the pilot's position was established over Brookville. He was then given a vector to the Du Bois Airport, which he found after some difficulty. When he landed, he had less than one gallon of fuel left in his tanks.

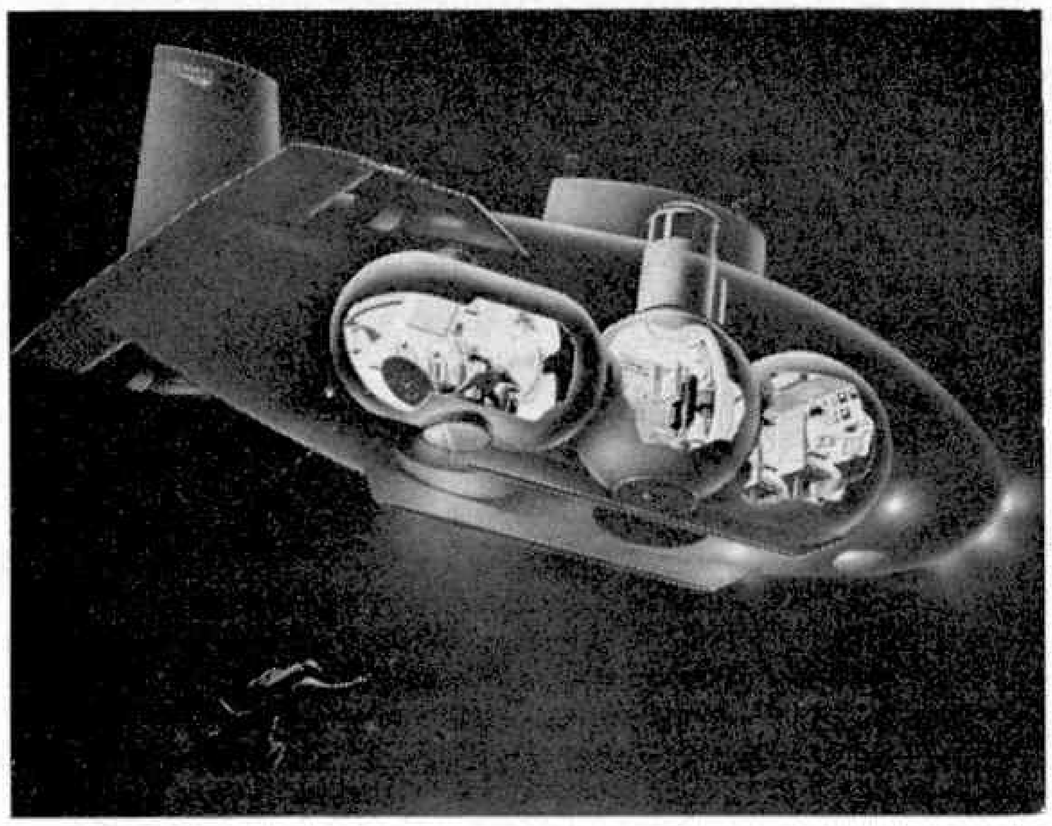
Not everyone welcomes such efficient work by the FAA radar operators. Following a recent robbery at a Wichita supermarket, one of the suspected hold-up men stole a single-engine lightplane from Stafford Airport and tried to make a getaway along the airways. The control tower at Wichita Municipal Airport was alerted, and soon controllers there were tracking the fleeing aircraft on their radar. When the aircraft passed beyond the range of Wichita radar, it was picked up and tracked first by controllers at the Kansas City traffic control centre and then by those at Fort Worth. The end result was a speedy arrest of the surprised fugitive shortly after he landed his stolen aircraft at Mustang Airport, El Reno, Oklahoma.

Heading photograph shows the attractive " VOLKSPLANE ", an all-wood monoplane of extremely simple construction.

Left: One of the smallest of them all. The STITS JUNIOR.

Above right: The GNOME, probably the smallest aircraft in the world flying at present. *Photo by courtesy of the Lincolnshire Press Ltd.*

Right: The WEE BEE, built for £71 had no cockpit! The pilot lay full length on top of the fuselage.



JEEPS OF THE DEEP

by H. McDougall

MAN KNOWS more about planets a million miles away than he does about the one on which he lives. But exploration of the underwater world—which has aptly been described as "inner space"—is accelerating. A variety of submersibles and other devices are being used although, in spite of the great advances that have been made in recent years, it is probably true that we are still in the neanderthal era of underwater exploration.

The Japanese and Italians, by developing midget submarines, and Captain Jacques-Yves Cousteau and Emile Gagnan by inventing SCUBA diving equipment, opened up the underwater world to sportsmen as well as serious explorers. The pioneering work has now been taken over by a host of inventors and a substantial number of manufacturers who are trying to make man as mobile under water as he is on, and above, the surface. The multi-million dollar research vehicles now in use demand the mastery of advanced technologies, yet there is still a requirement for inexpensive underwater vehicles to be used purely for sport. There is, for instance, an established demand for some kind of underwater bicycle.

The idea is not new. It occurred to Jules Verne who used it in one of his novels.

The Aerojet-General Corporation has made extensive experiments with what it describes as "swimmer propulsion devices and related submersibles." Systems tested included various combinations of undulating fins, fish propulsion simulators, streamlined hulls, swimmer's body fairings and helical propellers. The vehicles ranged from a pedal-powered underwater bicycle having no hull whatever to fully-enclosed plastic hulls equipped with battery-driven electric motors powered by conventional lead-acid batteries or high performance silver zinc batteries. Some experiments were also made with experimental CO_2 liquefied gas propulsion systems.

Aerojet-General engineers concluded that a fully-enclosed and properly streamlined hull in combination with a large diameter screw propeller rotating slowly was the ideal. Waterjet propulsion systems, while offering some unique advantages, could approach propeller efficiency only if impellers and ducting were kept large so that kinetic energy (velocity) losses in the wake were minimised. The shrouded propeller configurations explored by Aerojet were regarded as large, ducted axial-flow jets.

Streamlined hulls offer the advantages of drag reduction, energy conservation and heat conservation. They also make it possible to transport supplies such as reserve air bottles with a minimum of effort.

The simplest types are the free flooded "wet" hulls. The operator wears SCUBA equipment but the vehicle makes him more mobile than he is when swimming. This type of vehicle has attracted numerous amateur designers because it is relatively simple in concept. Since it is not enclosed there is no need for any form of pressurisation or air supply for the crew.

The Aerojet Minisub is typical of this type of vehicle. Space is provided for two men lying prone, side by side, with their heads and shoulders protected by large transparent plastic canopies. Visibility downward, ahead and to either side is virtually unrestricted. The craft appears in several versions, pedal-powered and/or powered by electric motors.

In the pedal model, one or both occupants can supply motive power through a double set of adjustable bicycle-type pedal assemblies geared to counter-rotating coaxial propellers. The prone position, while submerged, with body weight supported by water, has been found ideally suited for sustained pedalling; adequate speed can be maintained without undue exertion. Manipulation of a single control wheel linked to four moveable control fins gives the operator triaxial control. The Minisub is capable of any flight manoeuvre that can be performed by an aircraft (climb, dive, roll and turn).

The left-hand operator controls the vehicle; his partner attends to navigation, electronic and photographic equipment, etc.

The hull and fins are of fibreglass reinforced plastic. Metal parts are of stainless steel, monel, brass and aluminium, with plain steel parts kept to a minimum. The ball bearings are of steel but when properly sealed and lubricated with waterproof grease reinforced with a molybednum disulphide lubricant give years of satisfactory service, even in salt water. Although galvanic corrosion is present wherever dissimilar metals in the craft meet salt water, the objectionable effects of corrosion do not become apparent for long periods provided fresh water flushing is performed immediately after every use.

For serious underwater exploration, a true submarine is required. Perry Submarine Builders of West Palm Beach, Florida, produces submarines in two-place and five-place versions, as well as custom-building vehicles such as the Deep Diver, which is a "lock-out" submarine used to deliver divers to the ocean bed.

The smallest standard Perry vehicle is a two-man version, battery-powered and light enough to be hauled on a trailer. Maximum underwater duration is about eight hours; range twenty miles from base or mother-ship.

The diesel-battery powered five-man version accommodates a pilot in one compartment and passengers in another. The passenger compartment is equipped with an underwater hatch which, when the compartment is pressurised, may be opened for underwater exit, entrance, or retrieval of objects from the ocean floor. Maximum submerged duration is eight hours but the cruising range on the surface is 500 miles or more depending on the configuration.

The recent rash of accidents to atomic submarines will undoubtedly cause the development of the more advanced underwater research vehicles to be accelerated.

In the US, General Motors, through its AC Electronics Division is heavily engaged in underwater acoustic research and experimentation for the US Navy.

The latest research tool is a two-man deep-diving (6,500 feet) submersible dubbed DOWB (Deep Ocean Work Boat). It is 17 feet long and 8½ feet wide and has a two-man life support endurance of 65 hours and a range of 26 miles. A 360-degree freedom of visibility is provided with a television camera. Direct optical systems contribute to the capability to see in all directions. Other " seeing " devices are top and bottom mounted fathometers to measure the distance to the surface or bottom and a precision radar to detect obstacles on the ocean floor.

The pressure hull is a sphere with an internal diameter of about 80 inches. It is constructed of steel and is designed not to collapse at depths of less than 11,700 feet. Total payload is 1,021 pounds, of which 400 pounds is allowed for personnel and effects.

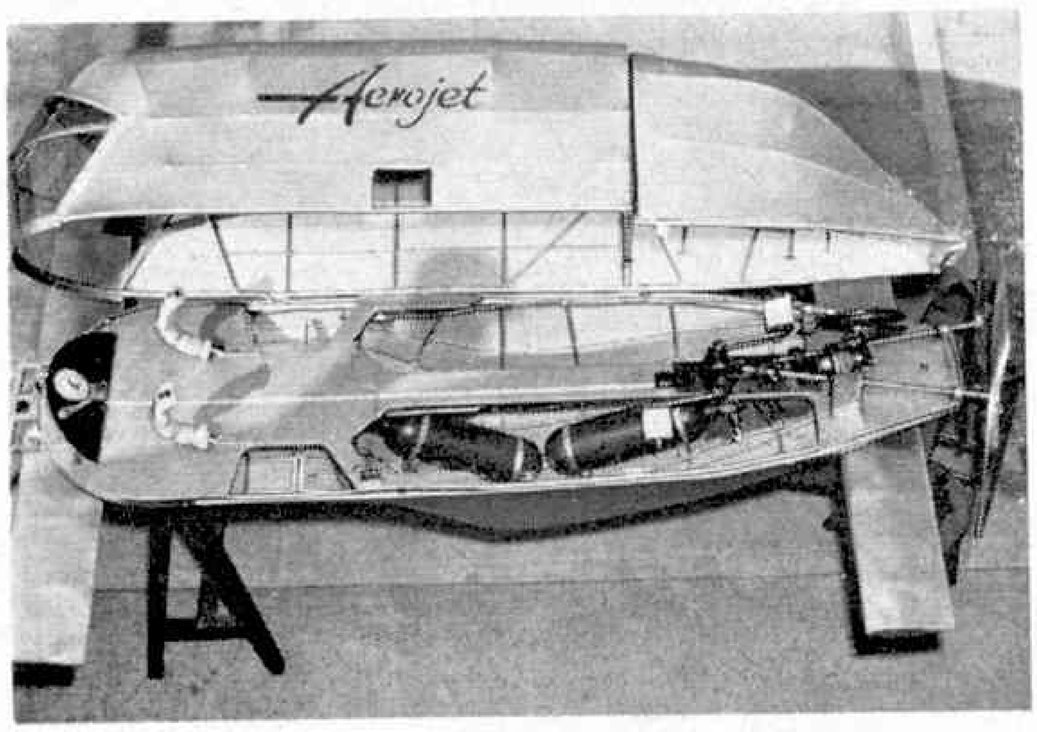
The hull is enclosed within a fibreglass reinforced plastic fairing 17 feet long. Power is supplied by batteries located outboard. There are four propulsion motors, each shaft providing 2 h.p. Two motors are for forward and two are for vertical propulsion.

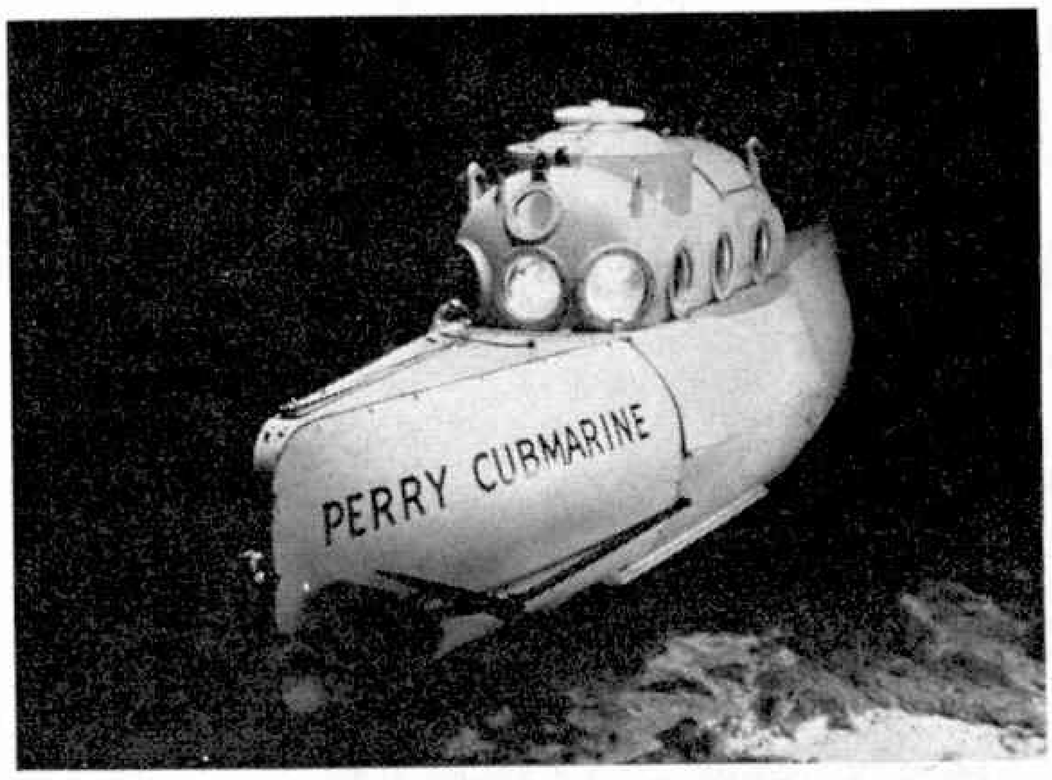
The alternating electric drive system is accomplished by friction gear reducers. Use of alternating current averts commutator problems associated with direct current motors which must be run in oil. The system also provides fast response of the submersible to the commands of the operator.

Range varies with speed. Full speed is 2.5 knots at which the range is 15.3 miles. Search range at 1 knot is 25.9 miles. Nominal atmospheric endurance is 65 hours for two men (130 manhours).

Mounted on the DOWB is a continuously-operating sonic beam, which keeps the surface ship informed of the submersible's position at all times. An underwater sonic telephone permits contact with the mother ship on the surface.

A manipulator equipped with a television viewing system is an important accessory. It is a dextrous





prosthetic arm with a reach of 49 inches and freedom of action to perform useful work. The television viewing system allows precision control of the device when performing delicate underwater operations or lifting objects which may weigh up to 50 pounds.

The current world's record for depth achieved by a true manoeuvrable submarine is held by the Lockheed research vessel, *Deep Quest*. It was taken down to 8,310 feet early in 1968.

The *Deep Quest* is about 40 feet long and displaces 50 tons. With a two-man crew it has an endurance of 24 hours at 2 knots. Four 7½ h.p. AC motors—two for forward and two for vertical propulsion—are provided. Water jet thrusters are used for lateral manoeuvring.

The pressure hull consists of two intersecting spheres made of steel nearly an inch thick. At a depth of 8,000 feet the hull must withstand a pressure of approximately 3,500 p.s.i.—more than 230 times those at sea level. The outer hull is made of aluminium and is free-flooding.

One of the most unusual submersibles is the Grumman/Piccard PX-15 which was designed to shelter six men for six weeks during an underwater exploration of the Gulf Stream. The PX-15 was built at the Swiss factory of Giovanola, S.A. in Monthey, about 250 miles from the nearest open water.

The hull is a ring-stiffened cylinder with hemispherical end closures. The reinforcing rings provide sufficient stiffening to permit safe operation at depths of 2,000 feet while maintaining a safety factor of two on hull collapse.

Construction differs from that of most submersibles, which usually consist of a spherical hull with most appurtenances on the exterior; in the PX-15, only minor structural components are located externally.

Although the prototype is outfitted primarily for the " drift " mission, a design flexibility has been built into the hull. At some future date it will be possible to separate the two sections forming the hull and incorporate a diver lockout chamber module or a new aft section hyperbaric chamber and diver lockout module. It may ultimately be feasible to change the internal arrangements so that six divers and three crew members can be accommodated for periods up to two weeks.

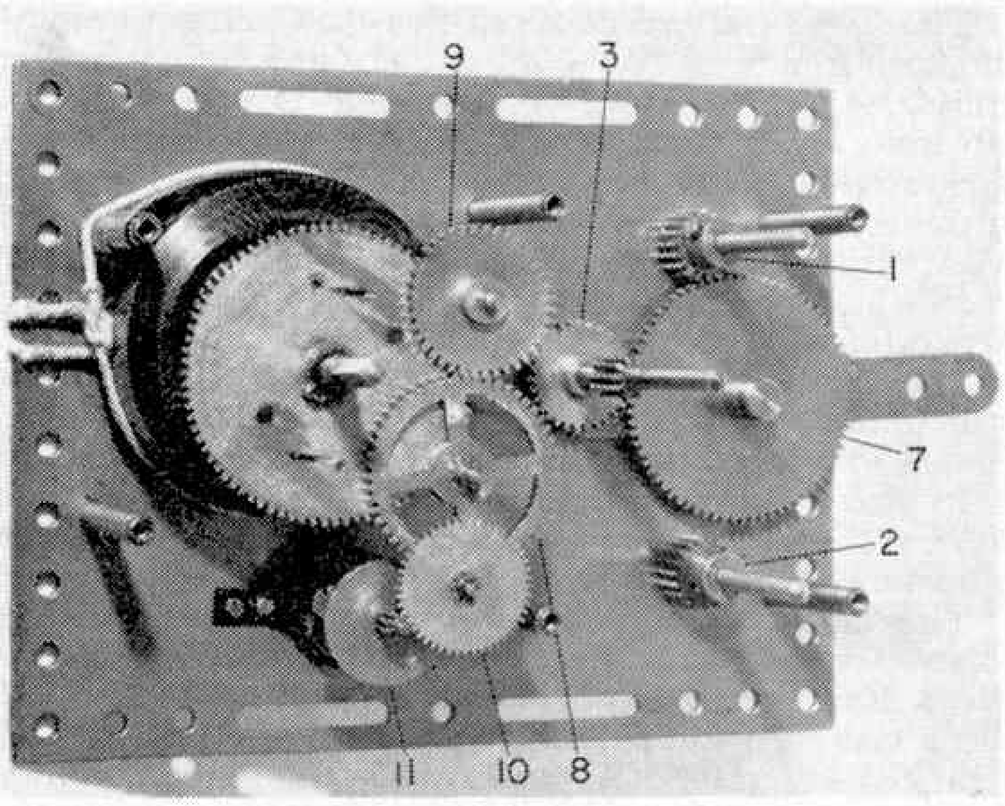
Top left: A phantom view of the research submarine Deep Quest.

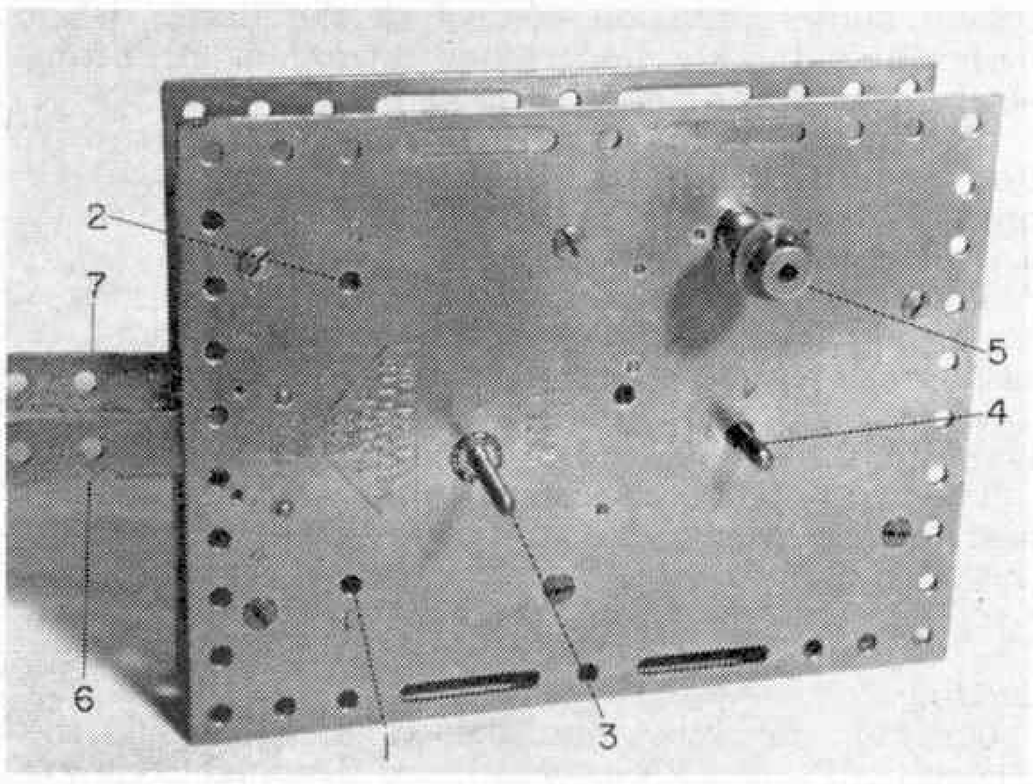
Left: The Aerojet underwater bicycles. The propellers are geared to pedals.

Above: The Perry two-man submarine can stay under water for eight hours.

COLLECTOR'S CORNER

B. Love takes a look at an early Meccano motor



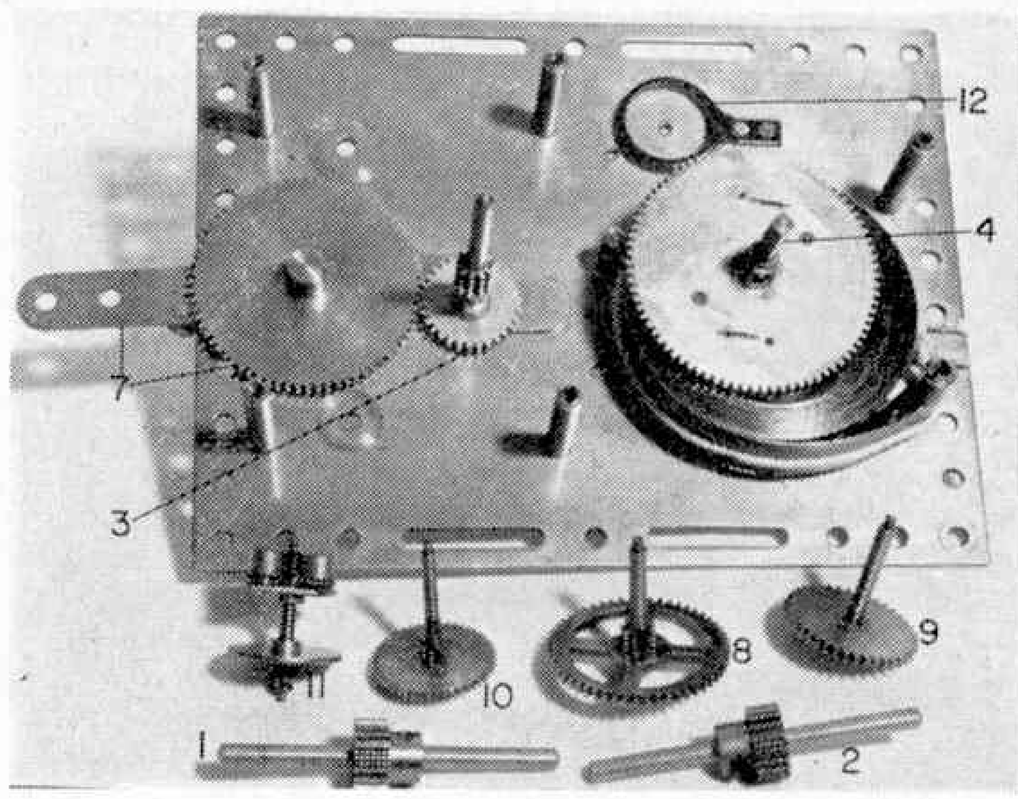


A LARGE number of older enthusiasts take a great pleasure in collecting examples of some of the earlier Meccano products and it is a great tribute to the Meccano system that a number of these early items are preserved in excellent order. The fine example of an early Meccano Clockwork Motor illustrated here was recently discovered by Jim Gamble of Nottingham in a collection of early nickel Meccano parts. A curious fact about this particular Motor is that, although it is clearly stamped No. 2 MOTOR MECCANO LTD. ENG., it is also stamped MADE IN WURTEMBURG and it is indeed a fine example of rugged German clockmaking. This Motor is sometimes known as the "Cathedral" or "Trinity" Motor because it has no less than three driving spindles as shown in the accompanying illustrations, where they are numbered 1, 2 and 3. The primary spindle, No. 3, is a fixture in the lower Motor plate and it imparts a drive to the secondary spindles 1 and 2 via a large idler gear on the control lever 7. Spindle 3 has two fixed gears, the lower of these having 30 teeth and engaging with gear 7.

It must be remembered that, at the time of the manufacture of this Motor, Meccano ½ in. Pinions had 20 teeth instead of the 19 teeth found on present-day Pinions. Thus, there was a step-up ratio between the primary and secondary spindles of 2 : 3 in the "Trinity" Motor.

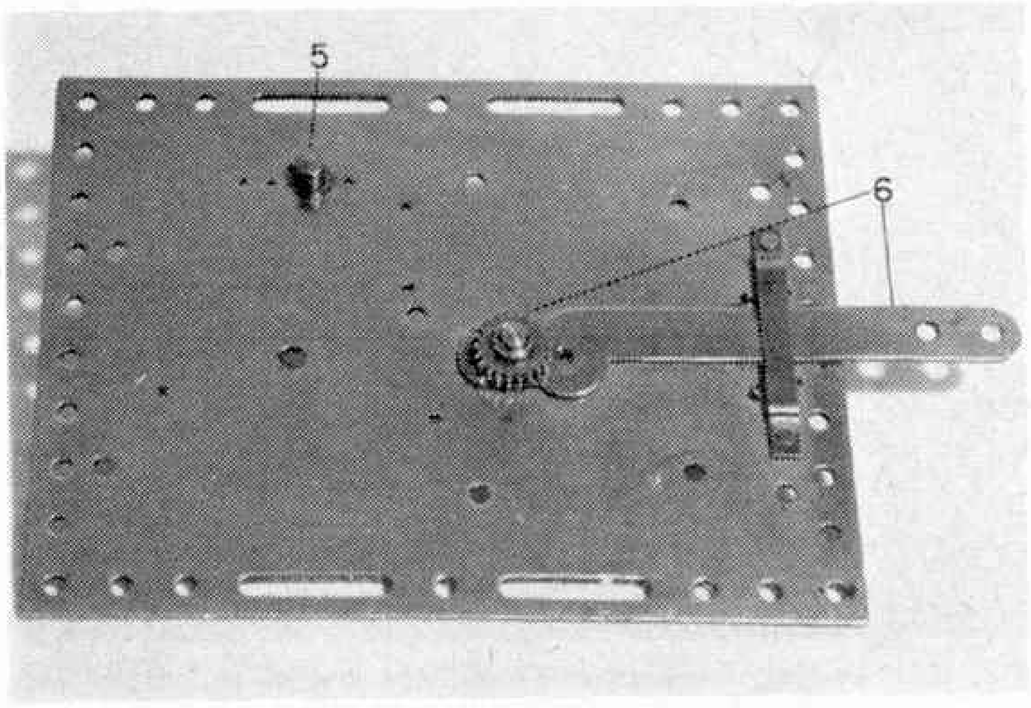
One of the accompanying photographs gives the impression that gear 3 is in mesh with gear 9, but this is not the case as they are set at different levels. The drive to the primary spindle from the Motor spring is actually via another idler gear 6, which reverses the direction of spindle 3 by being meshed either with gear 8 or gear 9. Although the original Motor would have been supplied with 20-teeth Pinions, the Motor will still run quite satisfactorily with 19-teeth Pinions. In this event, however, the gear ratio between primary and secondary spindles becomes fractional. The larger idler gear 7 does not affect the ratio. In operation, the primary spindle and *either* spindle 1 *or* spindle may be engaged, but not both together. The direction of all spindles is the same whether No. 1 or No. 2 is used, but they are all controlled by the main reversing lever 6.

A close examination of the exploded view of the "Trinity" Motor will reveal that the basic design of this original Motor is so good that its principles have been retained for more than half a century and are still embodied in the current Meccano No. 1 Clockwork Motor. The governor 11, with its constricting ring 12, is almost unchanged in design. Braking was carried out on its rubbing disc by a spring-loaded plunger 5, the business end of which can be seen protruding through the lower Motor plate. It was retained in the "off" position by withdrawing the plunger knob and making a half turn. The present Meccano Motor and most pre-war designs simply use



a lever with a small bent lug for a brake, but this also acts by pressure on the governor disc. The reversing motion is also a continuous feature through the "stable" of various Meccano Motors and the detachable top plate held on pillars with countersunk screws is typical of all successive models.

The motor spring is a very strong one indeed and had to be restrained with tough string before attempting to dismantle the Motor. This is a job which should not be tackled lightly as an unleashed spring can cause damage both to the Motor and to the person if handled without due preparation and respect. The author wishes to thank Jim Gamble for placing his newly-found "gem" at his disposal for photographic purposes and, talking of photographs, it is interesting to note that the accompanying gerenal view of the Motor is similar to that which appeared in the Meccano Manuals during the 1910-1920 period.



DRIVING SCHOOL FOR SCHOOLS

Described by Arthur Gaunt

Both girls and boys are being introduced to the points which make for good motoring. Instruction includes lessons to make them familiar with the workings of a car.

YOU WOULD like to be a motorist, but you're too young to apply for a learner's licence. That's a problem experienced by many senior school pupils today, and until fairly recently it has gone unsolved.

Now, however, there is a satisfactory answer. It has been provided by the Automobile Association, and it was launched at the Blackwell Secondary Modern School, Harrow, in September, 1965, when lessons in road safety and the basic principles of good driving were introduced into the curriculum.

Twelve pupils, aged 15-16, both boys and girls, were given expert instruction in these two subjects. As part of their studies they attended lectures in road safety, driving technique, the legal aspects of motoring, road signs, highway markings, and vehicle maintenance.

Films, working models, and sectionalised engines were used for instruction, and the syllabus included a visit to the Metropolitan Police Central Driving School at Hendon.

The most popular lessons was practical tuition in the school grounds at Harrow, where correct driving procedure was taught by using a dual-controlled vehicle made available by the A.A. That organisation provided instructors, and the police and road safety officials also co-operated in presenting the three-months course.

Adopted by 200 schools

That pilot course proved so attractive and useful that the idea has since been adopted all over Britain. About 200 schools now have instructional and driving courses, and the total continues to grow. The scheme has the backing of the Ministry of Transport, and is endorsed by educational authorities, safety organisations, and police forces.

During the first three periods (which take place on weekdays immediately after school hours), the pupils are introduced to the principles of road safety, vehicle control, and basic driving technique. Subsequent sessions are held on Saturday mornings, the scholars dividing into two groups. One group is given driving tuition in the school grounds while the other receives tuition in the classroom. The groups change over half-way through the morning.

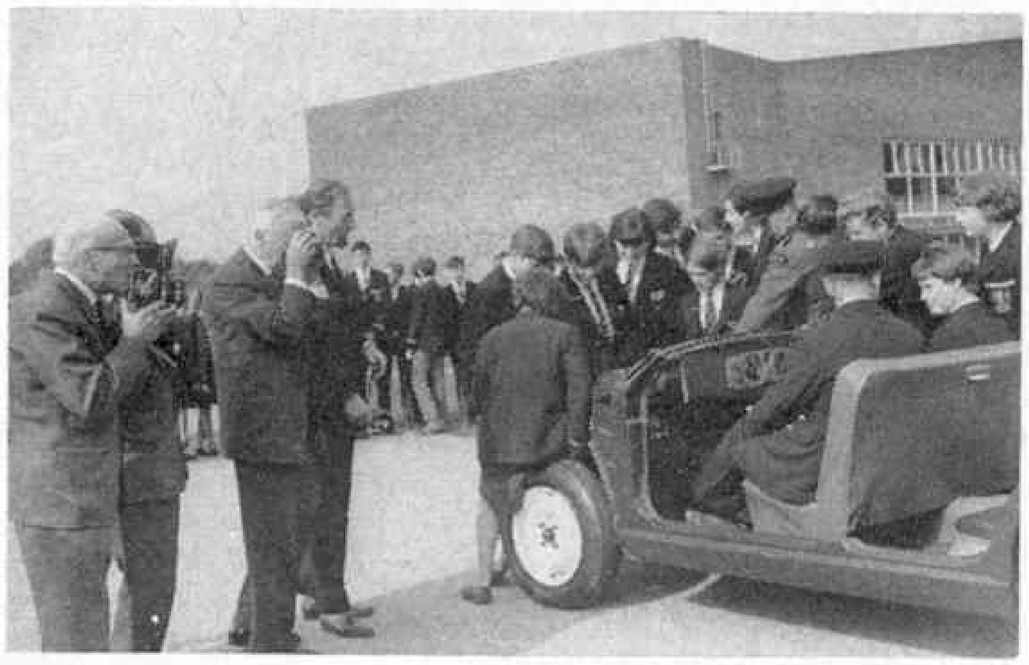
The purpose is to give sound preliminary instruction which will encourage in young students a responsible attitude towards motoring and road safety, before they undergo formal driving tuition with the object of passing the Ministry of Transport driving test.

The final day is devoted to a written test which takes about an hour, and a simple driving test to determine whether they have mastered the essential techniques of car control—such as correct use of the clutch, gearbox, steering, and brakes, both forwards and when reversing.

At the conclusion of the course a certificate is presented to successful students, but it is emphasised that the document in no way entitles the recipient to take a car on the road.

On the other hand, by following up the driving careers of pupils who have taken motoring lessons at school, it has been made clear that his or her chances of passing the Ministry of Transport driving test for an official driving licence at the appropriate age (17) are considerably increased.

Five out of six pupils from Blackwell Secondary Modern School, Harrow, who learned roadcraft there, passed the Ministry's driving test at the first attempt on reaching the age of seventeen.



On this specially constructed vehicle, would-be drivers are given technical instruction.

Typical questions

What questions are you likely to be asked in the written examination at the end of a school course in motoring? The test paper will probably require you to name the two types of hydraulic brakes used on modern cars, to state the advice in the Highway Code about moving away from the kerb, to say where on the public highway vehicles may be legally parked, to describe two circumstances in which it is permissible to overtake on the left, and to explain two instances when drivers should give way to pedestrians other than at zebra crossings.

You may be asked how you can be sure that the oil in the engine of a car is circulating properly, and you may be called upon to list the documents essential to a driver wishing to take a vehicle on to the public highway.

Advice about driving on motorways is included in the curriculum. The examination questions therefore embrace such matters as joining a motorway at an intermediate access point, and leaving one of these super-highways at an intermediate exit.

The Automobile Association point out that, as a nation, we are becoming more highly motorised every day, and that it is increasingly important to give young people the best possible preparation for their role as the motorists of the future. The Director General of the A.A. has stated his conviction that one of the key ways in keeping accidents to the minimum, especially among the critical 17-25 age group, is to teach the young to understand the difficulties and problems likely to face them when they begin to drive.

Ideally courses such as those already existing should be adopted by education authorities and operated in secondary schools all over the country as part of the normal teaching syllabus.

In America road safety and driving instruction have long been regarded as essential parts of the educational set-up, and as a result there has been a noticeable decline in the number of road accidents involving young drivers.

In Britain the years ahead will surely show that correct training in roadcraft and good driving should become an accepted part of the educational programme at senior schools.

Then, when they are of age, the pupils can go to a recognised driving school and take the M.O.T. driving test already trained in many of the things which some people take years to learn.

Mini cars provided

Since the motor-driving course was introduced at Harrow, many enquiries about it have come to the A.A. from education authorities in various parts of the country, and even from as far away as Australia. Figures do not always present a complete picture, but it is worth noting that 68 pupils out of 72 successfully finished the course at Blackwell School. At Birmingham 57 out of 60 senior scholars successfully completed five courses.

Motorists of the future undergo classroom instruction, and also receive practical lessons in driving.

Organisations interested in various aspects of motoring have not only given their blessing to such schemes but have helped in practical ways.

Lordswood School, Edgbaston, Birmingham, was provided with two Minis by the Company of Motorists. The petrol companies have given generous help by providing free literature, and suitable films have been made available by such bodies as the Royal Society for the Prevention of Accidents.

Movies on driving techniques, and stripped-down vehicles help the trainees to understand how a car works. The A.A., as well as providing instructors, supplies leaflets illustrating road signs, road markings, and other things which motorists must see and obey in order to be good drivers. Invaluable help has also been given by police authorities and by individual members of the Force.

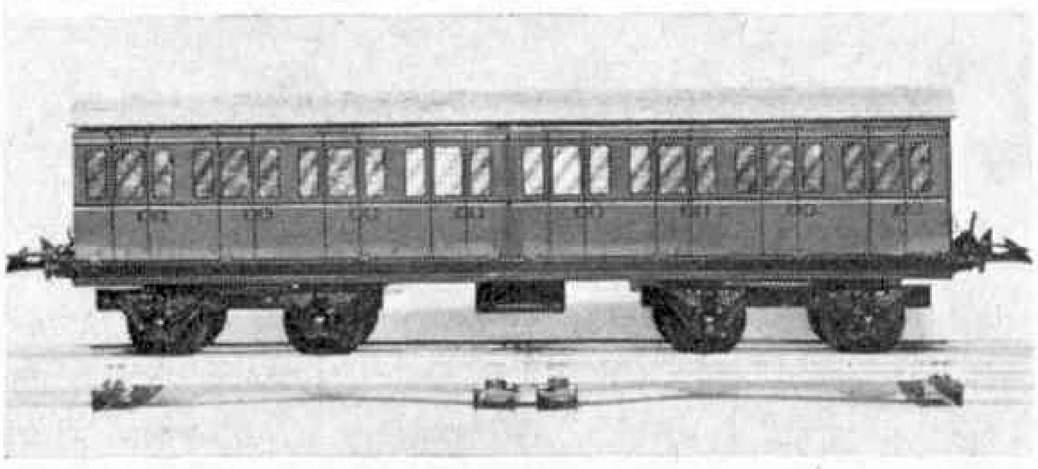
Thanks to this enterprise, budding motorists are being introduced to the conditions they are likely to encounter when they become fully-fledged drivers. And there's little likelihood of pupils walking unwillingly to school when driving lessons are on the syllabus!

MODIFICATIONS TO HORNBY

by P. E. Randall

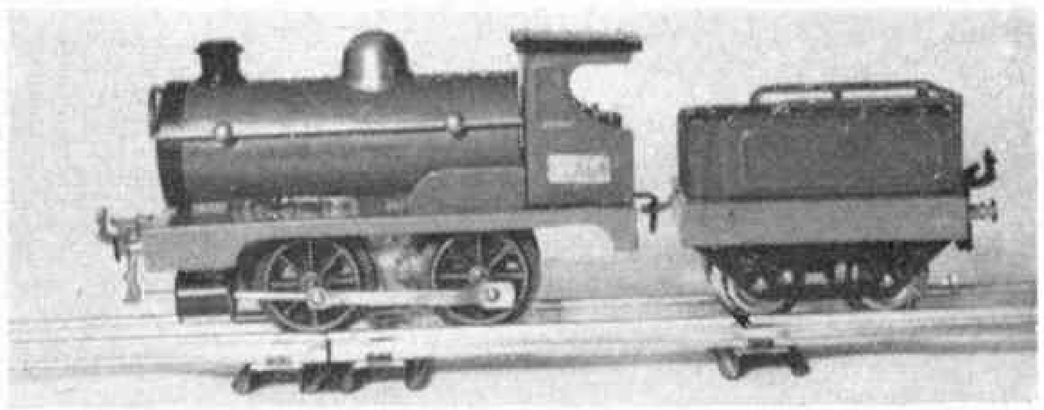
THE HORNBY collector is sometimes in doubt as to what standards he should adopt, and what, if any, modifications he should allow. The easiest course is probably followed by the absolute purist, because he insists on every item in his collection being as it was made. Leaving our purist, however, we find all manner of alterations being undertaken, which, for convenience, we can divide into those relating to appearance and to operation.

If one obtains a very old Hornby locomotive, the paint is usually either chipped or scratched, unless one is rich and in the position to make a bid for the few mint locomotives still in circulation. Restoration is usually a question of touching in or of a complete re-paint. The former calls for considerable skill, and the latter for much work in applying several coats of new paint after stripping off the old. The style should pre-



ferably be the correct one for the period, which means looking up old "Hornby Books of Trains." However, it's a free country, and some collectors prefer to re-paint in styles to suit their own skill or taste, or possibly to make a complete change. Examples of this, which I have seen, are 3C locomotives painted in BR colours and looking very smart, and I did once see one finished in orange with "Happy Valley Railroad" on the tender!

Rolling stock is usually restored in the same way but here one finds more examples of freelance work, and I have come across wagons and vans which Mr. Hornby never knew, such as "Jet" Petrol Tanks and "Players" Vans. I must admit a fondness, myself, for the "two tone" rolling stock colours and I have been tempted to paint a post-war wagon in the pre-war colour combinations of blue and yellow or red and green. I would also very much like to own a No. 50 locomotive and tender in BR blue, if anyone could be found who could paint one to Hornby standards, at a reasonable cost.

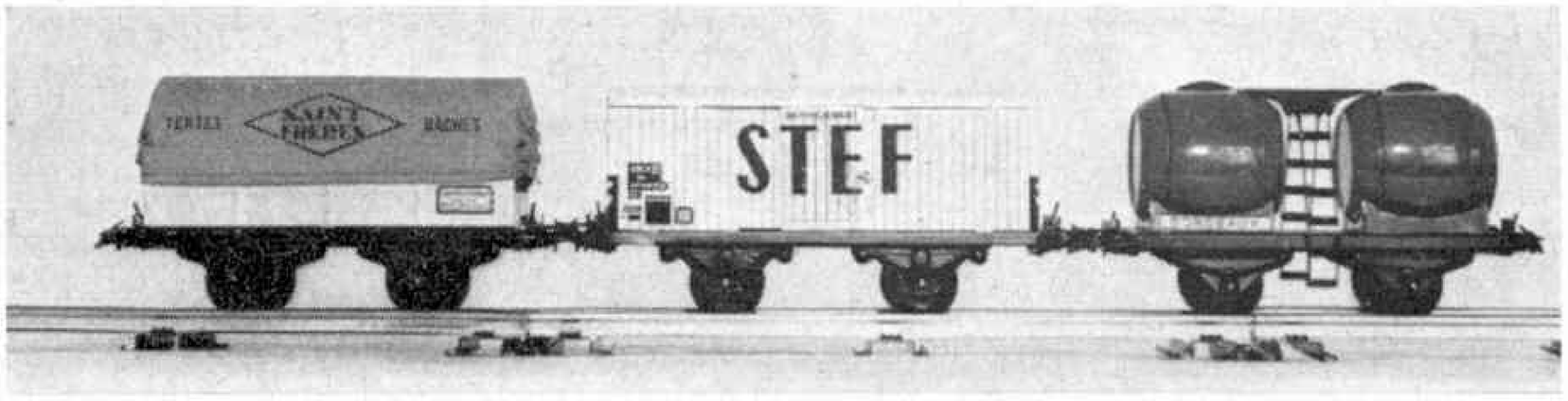


Structural modifications can be a more complicated business and many possibilities exist. Again, I feel it is preferable to restore to the correct style for the period, although like many collectors who are also operators, I fit my rolling stock with plastic wheels for better running. I would also like to fit Hornby link couplings throughout if I could come by a gross or two, as I prefer them to the automatic ones. What I personally cannot bear to see however, is a Hornby item fitted with scale wheels, buffers, or couplings. In order to explain this point to any readers who may be model railway fans rather than Hornby collectors, it might help here, to show the difference between the two types of enthusiast. Nothing illustrates this more clearly than my own preference for a Hornby "Royal Scot" as opposed to a scale model of this engine. I think now, as I thought forty years ago, that "Royal Scots" *should* be 4-4-2's and if the real one was a 4-6-0, then the real one was wrong! I suppose there could be no greater loyalty to Hornby than this!

Cannibalisation of Hornby components is practised a good deal, usually to obtain better running. Mr. Y. A. Medcalf of Headley Down, Hants., is the proud possessor of one of the fine old Hornby No. 2 Locomotives of 1925 vintage, and he tells me of an interesting modification that he made some years ago. The running of the tender was unsatisfactory and so he obtained a "Riviera Blue" bogie tender and switched bodies, since when the running of the "2711" has been most satisfactory.

Free lance construction is possible if one has the skill to break down and re-assemble Hornby components in ways which were never contemplated at Binns Road, and some I have seen would render the purist speechless! Among the most interesting were a "Garratt" locomotive made from two 501 locomotives joined together, an 0-4-0 with a lengthened boiler re-built as a 2-4-0, and a bogie coach made by soldering together two four wheeled coaches. Perhaps the ultimate in this direction would be to design and build an 0-4-0 clockwork locomotive completely from scratch, a sort of super No. 1 Special of the 1970's!

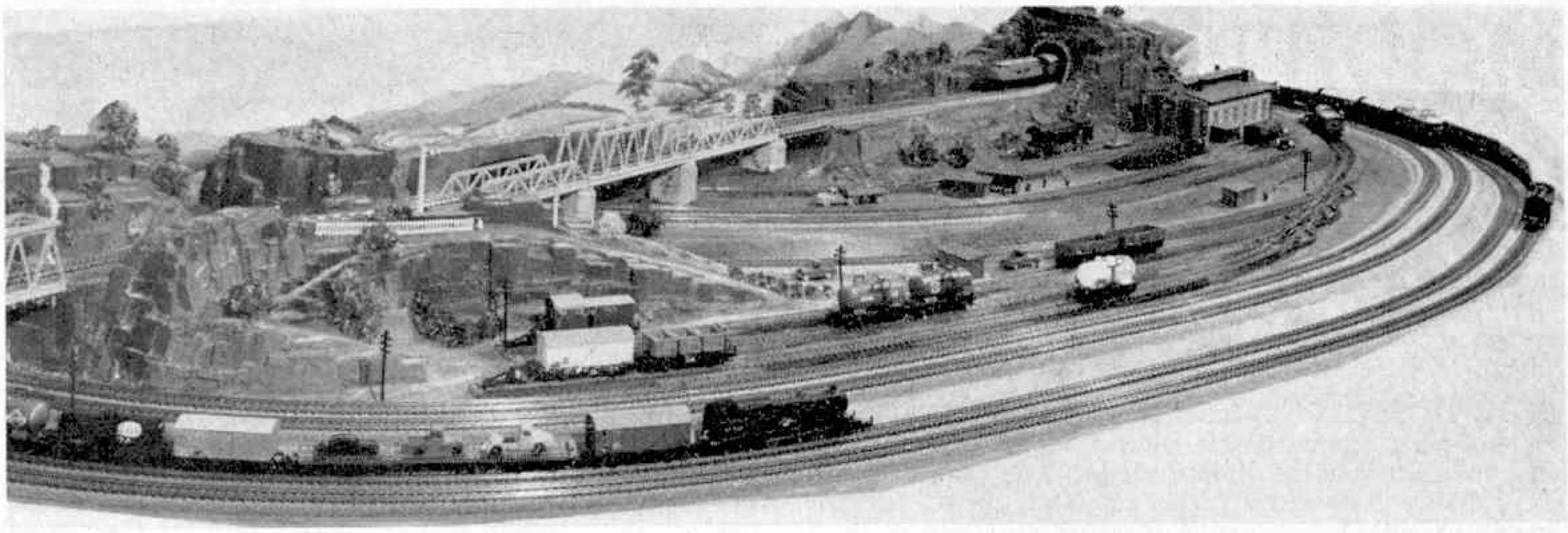
May I conclude, this time, on a personal note, by thanking those "MM" readers who have written to me, and I am always delighted to hear from fellow collectors.



Above right: One of the old Hornby repainted in green and red.

Above: A B.R. Bogie Coach made from two No. 41 coaches.

Right: Modifications have entailed raising the coupling height and fitting plastic wheels.



★ ★ ★ ★ ★ ★ ★

BUILDING AN "N" GAUGE LAYOUT

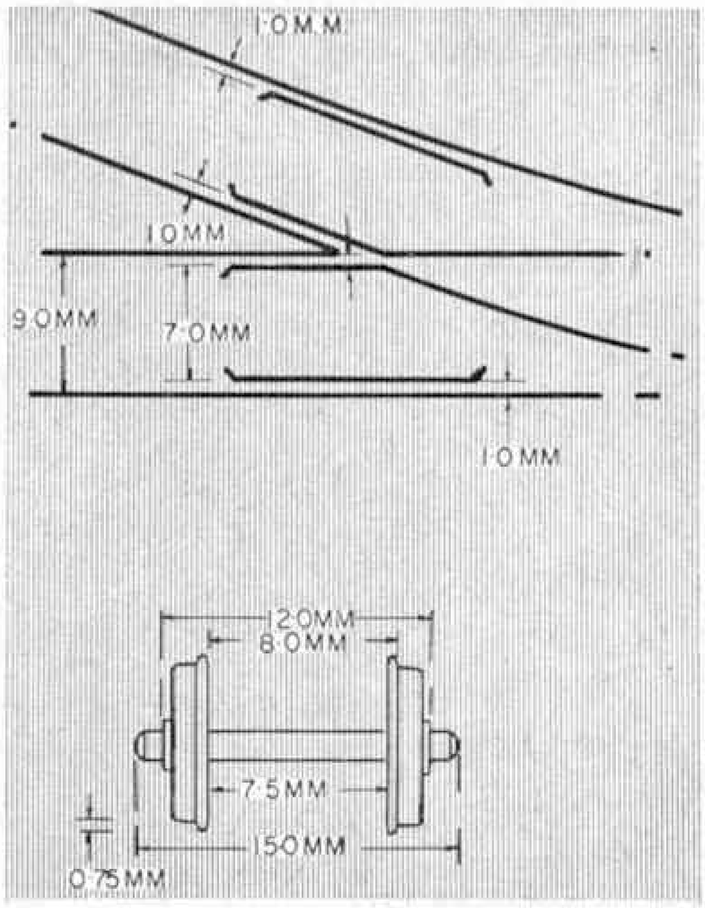
A new series by P. Tomlinson

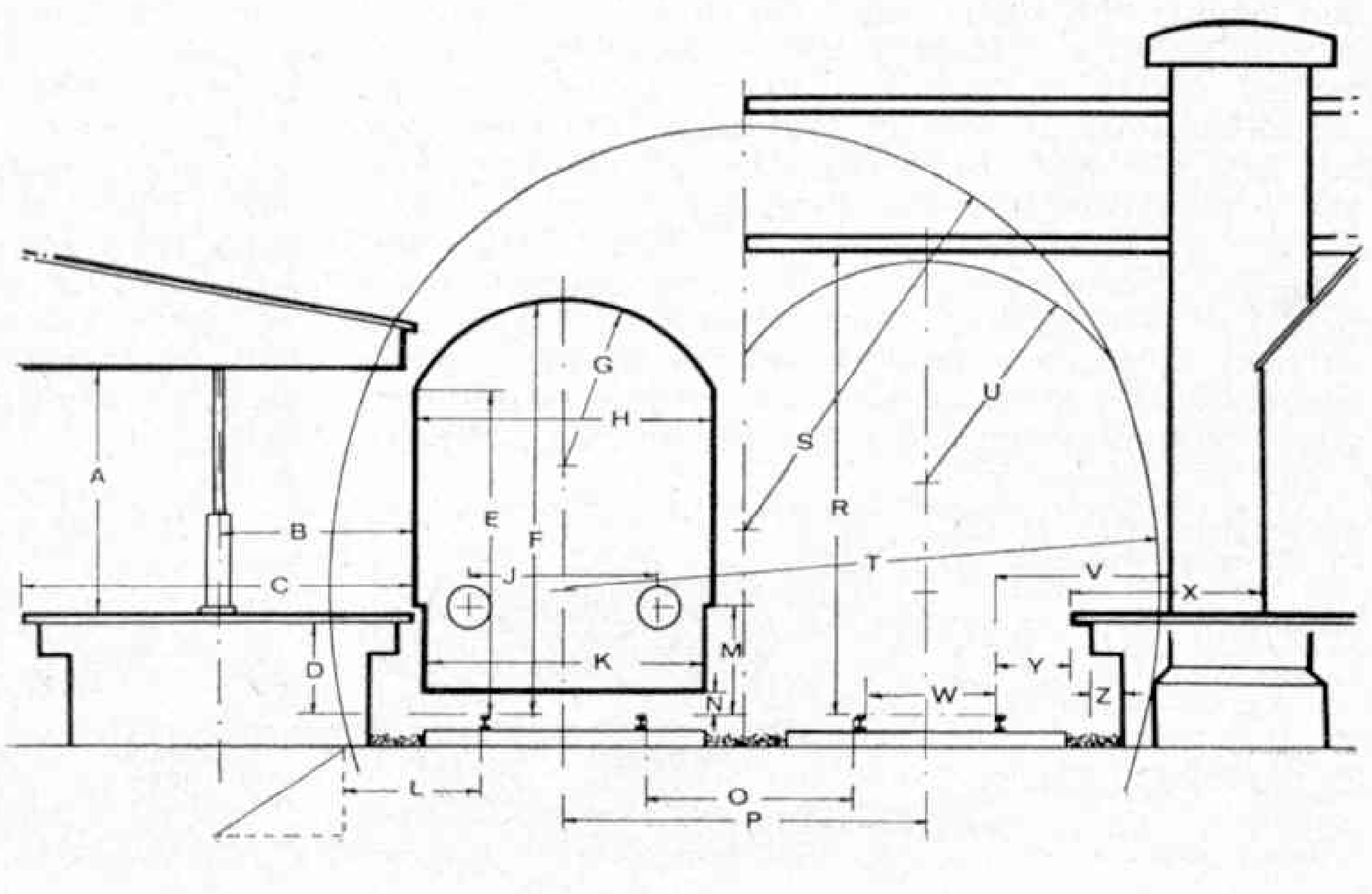
Part 1—Why 'N' Gauge?

★ ★ ★ ★ ★ ★ ★

IF YOU own a train set, sooner or later you will get the urge to extend it into a proper model railway, and so at the outset it might be as well for me to define exactly what a model railway is.

At one time the possession of some scale models was considered quite enough evidence of a scale model railway, but now that the majority of commercial trains are in themselves scale models, this distinction no longer applies. Possibly the best distinction would be to say that a scale model railway is authentic in as much as every individual model is appropriate in its setting. For example, you would not provide a small single track station with a large Euston-type Doric arch, nor would you model a large terminus with a couple of wooden shacks. If possible the track layout should be a reasonable copy of prototype practice, not

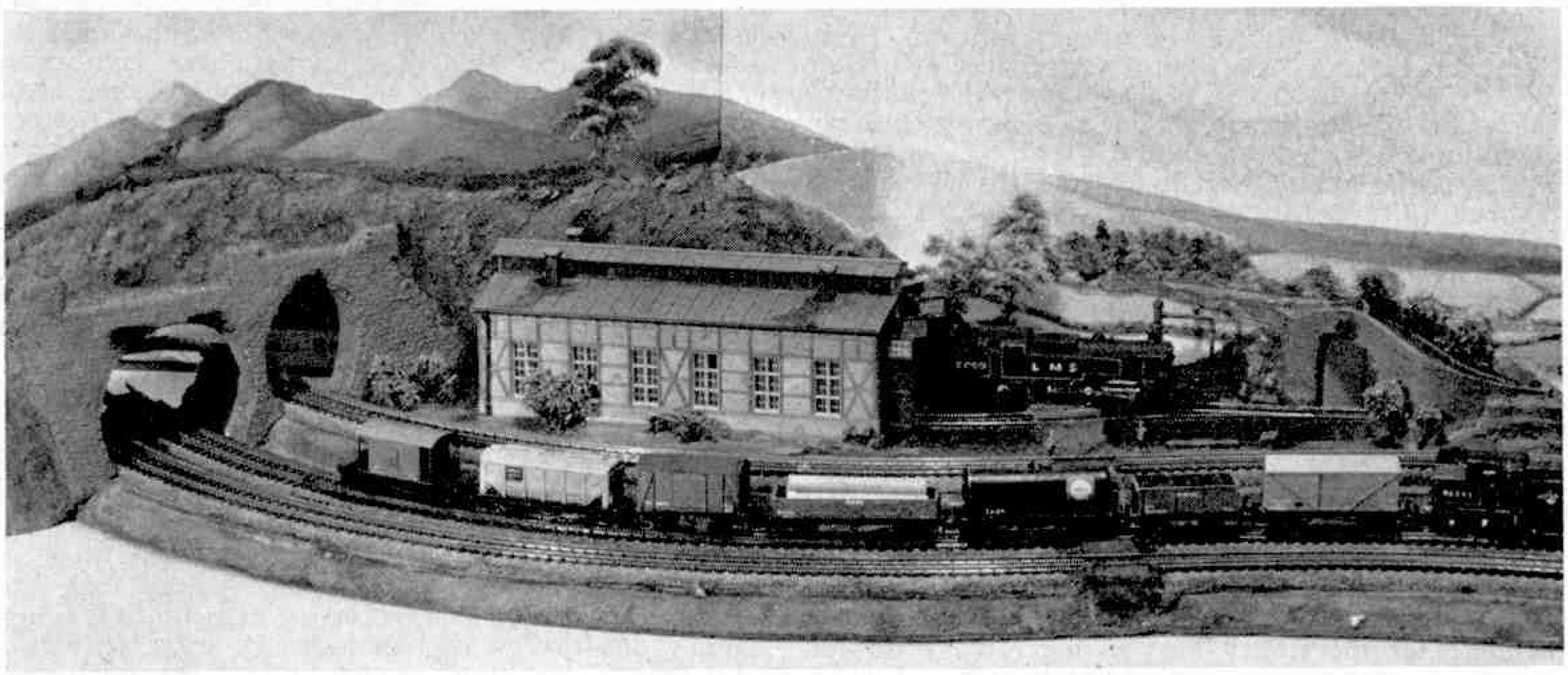




only because of the appearance, but also because prototype practice in track layout is the result of years of practical experience in building stations which must be worked as easily and efficiently as possible.

It therefore follows that the main essential of a model is a good layout plan, but before we explore this topic, it might be as well to decide which scale to work in. No doubt many of you will already be committed to a particular scale, but there will be others who have not yet made up their own minds on the subject.

This problem of which scale to work in is definitely related, of course, to the kind of space there is available and also to the amount of money you can afford to devote to the layout. These, however, are only two influencing factors, and for instance, there will be those of you that like to plan a complete miniature countryside round the railway, while others will be quite content with a terminus station and loop on which to despatch and receive traffic. Finally, there will be those of you that have little interest in anything beyond locomotives and rolling stock, and their construction.



At the present time there are virtually six different scales and gauges available commercially. Of these six, O-gauge may be ruled out on consideration of size and availability, and also the high cost of commercial items. HO gauge is similarly less well catered for, although there is a considerable amount of equipment used in this country originating from the continent and the U.S.A. TT gauge, so popular only a few years ago, has unfortunately become virtually extinct where newcomers to the hobby are concerned, which leave us with the well established OO gauge, the up-and-coming OO narrow gauge, and the relative newcomer—N gauge. Of the first two—particularly the former—much has been, and is being, written, and therefore in this series of articles I propose to describe in detail the construction and operation of a small N gauge layout.

One main advantage of N gauge over the other scales is its small size. In fact, it is the smallest of the commercial model railways using nine millimetre gauge track (hence "N" gauge) with models built to a scale of two millimetres to one foot. Quite a lot of railway will go into the space available to the average person and in fact, it is quite possible to model a medium size station and also to have scale length twelve coach trains on the sort of baseboard previously used for the toy train set. In such a small scale it is now possible to think of building a true model of a railway, and also of the first time, scale models of some of the larger buildings and civil engineering structures become a practical possibility.

Due to its very smallness, this new scale will attract many people to the hobby who have never modelled railways before, and who will require some basic ideas on modelling particular items. Also, experienced modellers who have "reduced" from the larger scales may require assistance in adjusting to working in a smaller scale. Therefore, I have reproduced in this first instalment, a useful drawing giving the loading gauge dimensions of N gauge, together with those of the prototype British Railways. The dimensions for structures, tunnel clearances, and bridge heights are minimum ones, and all the measurements are in accordance with British Railways standards charts.

For the benefit of those who like to make their own track, I have presented opposite, a drawing giving track and wheel standards for 2 mm. to 1 ft. scale, based on a number of measurements taken from various commercial items of different manufacture. In presenting these standard dimensions, it cannot be stressed too strongly that they are only recommended figures. There is nothing agreed about them at all, but they have been calculated to give the best possible trouble-free running and interchangeability within the gauge, mainly with considerations of commercial manufacturing. There is nothing whatsoever to prevent a modeller working to dead scale if he wishes, provided that he is prepared to operate on large radius curves with everything else in proportion.

Next month I shall be discussing the design and construction of the baseboard, followed by some ideas on designing suitable track plans. Although the natural order of these two subjects might seem to be the wrong way round, I hasten to add that as I have somewhat limited space available, I prefer to build the baseboard first and then plan the layout to fit, despite the fact that it is far more preferable to design the layout plan first.

Finally, should anyone have any ideas, comments or questions concerning N gauge, I shall do my best to answer these in future articles if they care to write to me, c/o the Editor.

A. W. Neal describes two rather unusual means of . . .

TRANSPORT IN THE PAST

THE INTRODUCTION of the tram as a means of public transport was a great step forward. However, with the rapid increase in the number of private cars on the roads it soon became apparent that trams had one severe shortcoming. The rails on which it ran naturally determined the route the tram had to follow, and as traffic generally built up, and the now all too familiar traffic jams became more frequent, this drawback came to light. Trams couldn't skirt around traffic congested streets, but being tied to a predetermined path were forced to stop, and add further to the ensuing chaos. Obviously, with the prospect of road congestion getting worse, rather than better, an alternative had to be found. Trams were however despite other drawbacks, comparatively cheap to run and maintain, so it was desirable that its successor should use the same motive power, but without the restrictions imposed by rails. Thus the trolley bus came into being.

Their first appearance, more than ten years after the preliminary trials, was made in the continent, but they did not become very popular there. The earliest examples of the trolley bus in this country was an experimental model built for the Metropolitan Electric Tramways Ltd. by the Railless Electric Traction Co. Ltd. Electrically equipped by the British Thomson Houston Co. Ltd. and fitted with a hand-operated series-parallel controller and two 25 h.p. motors, the vehicle was unfortunately never developed beyond the experimental stages. It was not until about 1931 that the first trolley bus fleet in the London area was put into service. In 1911, however, both Bradford and Leeds inaugurated trolley bus services on short sections of their tramway routes, and these were the first such services to operate for public service in Great Britain. They aroused considerable interest and soon other towns began to follow suit. But their popularity, at least in England, was short-lived. Why was this?

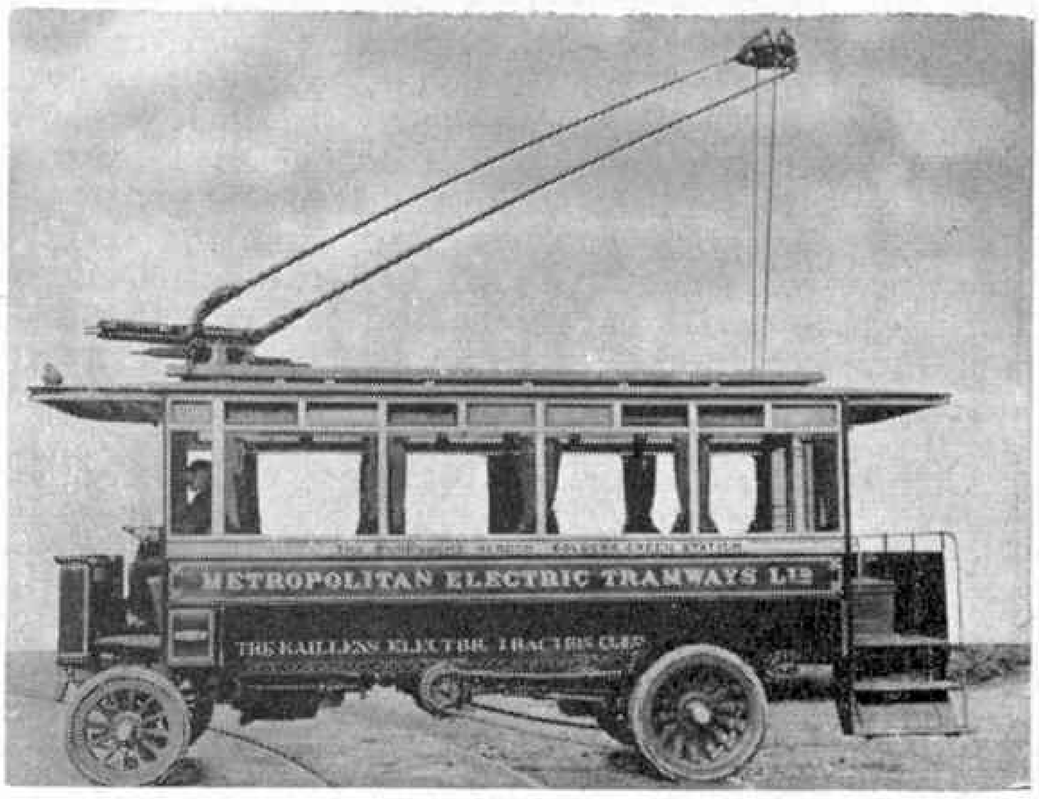
The decline in their popularity is due to a number of causes. The development of the internal combustion engine over the past twenty years is one reason. Also, it would not be economic and certainly not attractive to have overhead equipment strung up whenever a public transport system was required. There are cases of course, where electrical energy can be produced cheaply, and in such cases the trolley bus is still the answer.

Nevertheless, it is sad to see that this interesting vehicle had such a small place in the public vehicle field.

Another vehicle which had a brief existence was the Gyrocar. Using basically the same Gyroscope we used to play with when we were children, this remarkable vehicle was able, due to the large Gyroscope mounted in the body, to balance on two wheels, even when stationary. The car itself could carry six people, and so good was its stability that if all the occupants moved over to one side it barely leaned over. As far back as 1914 the application of the gyroscope to the stability of ships and aircraft was discussed, but nothing of any consequence came about. The Gyrocar, the invention of Count Pierre Schilowsky did, however, make some impact on the vehicle scene some fifty years ago.

There seems to have been two examples built, one of British origin, and the other, slightly different in detail from South Africa. The British model built by Wolseley, had the body of a car, and two wheels set one behind the other like a bicycle. Because of this, the gyrocar's manoeuvrability was excellent, and its turning circle was remarkable small. The speeds that it reached were obtained using less power than an orthodox car with the same seating capacity, this being largely due to less friction losses by using only two wheels instead of three or four. When the vehicle was not in use, it was kept upright by automatically lowering two small side wheels to the ground.

Unfortunately for Count Schilowsky, the gyrocar never became popular—it seems that unorthodox vehicles never do—and it and its inventor disappeared from the car scene.



THE CINEMA ON STAMPS

by James A. Mackay

IT SEEMS strange to think that, barely 75 years have elapsed since the cinema was born. Photography was still in its infancy when the American inventor, Thomas Edison, turned to the problems of motion pictures in 1887. His early attempts, using spiral tapes and cylinders of microscopic pictures, were unsuccessful. Two years later George Eastman invented photographic film on a nitro-cellulose base, a material evolved to supply the roller photography of the Eastman Kodak. Edison purchased a sample strip of this film and used about 50 feet of it to demonstrate his "kinetoscope" in October 1889—the first motion picture.

This machine, operating on the peep-show principle, gave a motion record of 48 exposures per second—which meant that the first film show lasted exactly thirteen seconds! It is interesting to note that the size of film, the image and the arrangement of the sprocket holes continue as standard in cinema production to this day.

Both Edison and Eastman, pioneers of the cinema industry, have appeared on American stamps, in 1947 and 1954 respectively. The fiftieth anniversary of the first commercial cinema was also celebrated by an American stamp in 1944; appropriately enough it showed G.I.s being entertained to an open-air film show somewhere in the Pacific. Edison's kinetoscope was given its first public showing at 1155 Broadway, New York on April 14th 1894.

Within a few months kinetoscopes became all the rage and machines were exported to France and Britain. The first cinema camera weighed nearly a ton and this restricted the subjects of the earliest films. The kinetoscope was, however, doomed to failure since very few people could see the show at the same time. The problem of projection was solved by two French brothers, Louis and Auguste Lumiere, who devised the *cinematographe* enabling the film to be beamed on to a screen. France celebrated the 60th anniversary of her cinema industry with a stamp in 1955 portraying the brothers Lumiere (their name, incidentally, translates as "light").

The early films were staged as an act in music halls and vaudeville shows and this is reflected in the quality of the pictures produced. About 1909 George Melies brought new life to the art of the cinema, with trick photography involving fade-outs, dissolves and double-exposures. His best-known film was the humorous *Journey to the Moon*. A French stamp of 1961, marking his birth centenary, featured Melies with a clip from this film.

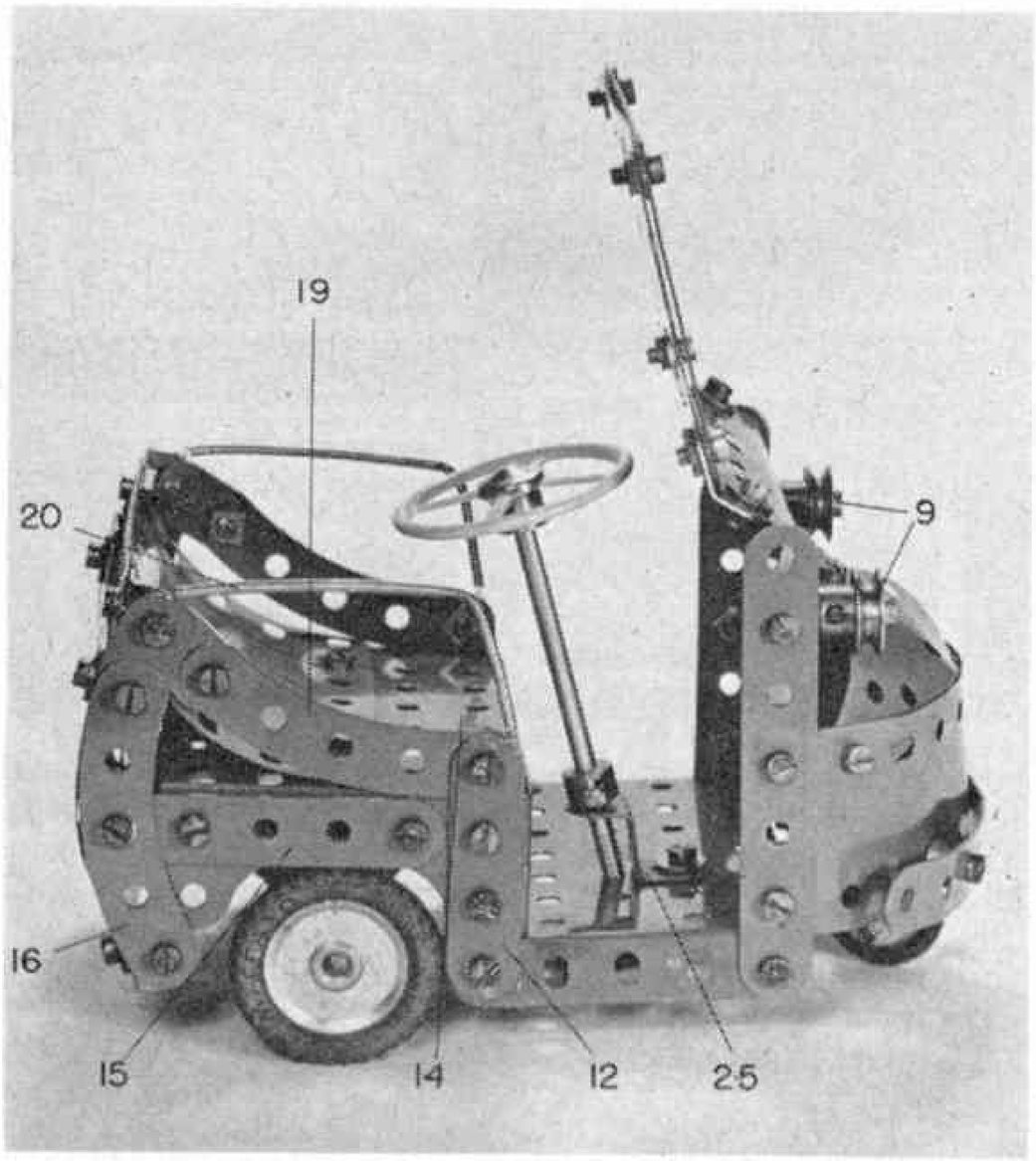
Although the cinema is justly regarded as one of the three most important media of mass communication in the modern world, it has had scant recognition on postage stamps, though here and there one may come across a few interesting examples. In 1964 Russia issued a stamp to mark the 70th anniversary of the birth of A.P. Dovshenko, the famous film-producer and the following month released a stamp honouring the 30th anniversary of the Revolutionary epic Chapayev, showing a scene from the film. Three stamps honouring Soviet Cinema Art were released in 1965. The 4k stamp showed a scene from Eisenstein's classic *Battleship Potemkin*. The other stamps depicted a shot from *Young Guard* and the recent film *Ballad of a Soldier*.

Last year the United States issued a 6c stamp in memory of the late Walt Disney. The stamp showed Disney with some of the wonderful cartoon characters which he created. Film actors and actresses have appeared on a comparatively large number of stamps. From France have come stamps portraying Gerard Philippe (1961) and Sarah Bernhardt (1945), while a recent stamp from Czechoslovakia has portrayed none other than Charlie Chaplin. But the best known actress to appear on stamps is Grace Kelly who, as Princess Grace of Monaco, has been portrayed on many stamps of that country since 1956.

The theme of the cinema on stamps has been given a big boost by the release last March of a long set of stamps from the Persian Gulf sheikhdom of Umm al Qiwain. A cinema was recently opened in the sheikhdom and to commemorate the occasion a set of twelve stamps—six airmail and six ordinary postage—was issued. Each stamp features a scene from a famous film. The ordinary postage series depicts Al Jolson with May McAvoy and Richard Tucker in *The Jazz Singer*, the first talking film made in 1928 (10d.), Charles Laughton and Binnie Barnes in the famous banqueting scene from *The Private Lives of Henry VIII* (15d), Charles Laughton and Clark Gable in *Mutiny on the Bounty* (25d), Clark Gable in a passionate embrace with Vivien Leigh from *Gone with the Wind* (50d), Humphrey Bogart and Ingrid Bergman in *Casablanca* (75d) and George Sanders and Anne Baxter in *All about Eve* (1r). The airmail stamps feature Karl Malden and Vivien Leigh in *A Streetcar Named Desire* (1.50r), Humphrey Bogart and Katharine Hepburn in *The African Queen* (2r), Alan Ladd and Brandon de Wilde in *Shane* (2.50r), Alec Guinness, William Holden and Jack Hawkins in *The Bridge on the River Kwai* (3), Charlton Heston and Jack Hawkins in *Ben Hur* (4r) and Peter Ustinov with Jean Simmons in *Spartacus* (5r). The stamps are printed in black on silverised paper and the addition of sprocket holes at the side heightens the illusion of film strips.

COMMUTER CAR IN MECCANO

by Spanner



IN RECENT years the chaotic state of town traffic has led to considerable research into vehicles specially designed for the commuter who, for various reasons, finds it advantageous to use his own form of transport. The resulting vehicles, while often being referred to as "commuter cars," have generally turned out to look nothing like cars as we know them. Whatever they may *look* like, however, their suitability for the the job for which they are intended is undeniable.

What are the requirements for a commuter car? Well, it must be small to prevent it taking up too much room both on the road and when parked, yet it must be sufficiently large to accommodate the driver and preferably a passenger, as well as a fair amount of luggage. It must also have a highly-economical power plant yet one with enough power to give the car sufficient speed to enable it to keep up with other town traffic —say 30 m.p.h.—and, above all, it must be fully manoeuvrable. One prototype commuter car which meets all these requirements is the Colliday Chariot developed by engineer Mr. R. G. Collier. Capable of carrying two adults and two or three children plus a load of luggage at something in excess of 30 m.p.h., it is powered by a small, quiet petrol engine and has the almost unbelievable turning circle of only 7 ft. Simple controls include a starter switch key, a steering wheel and two foot pedals marked "Stop" and "Go" —nothing complicated to worry about there!

The small Meccano model described below was inspired by the Colliday Chariot and it is as equally devoid of complications as the original. The chassis consists of a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate 1, to the forward end of each flange of which a $3\frac{1}{2}$ in. Strip is secured. Bolted between these Strips are a second $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate 2 and a curved $5\frac{1}{2} \times 1\frac{1}{2}$ Flexible Plate 3. Attached to the lower end of Flanged Plate 2, in the centre, is a $1 \times \frac{1}{2}$ in. Angle Bracket, its longer lug projecting forward. Lock-nutted to the end of this lug is a Single Bent Strip 4 between the lugs of which a $\frac{1}{2}$ in. Pulley without boss is mounted, together with two Washers, on a $\frac{3}{4}$ in. Bolt. If available, a $\frac{15}{16}$ in. Dinky Toy Tyre 5 (Sales No. 096) should be mounted on this Pulley, then an Angle Bracket 6 is fixed by Nuts on the Bolts, as shown. The steering linkage will later be lock-nutted to the free lug of this Angle Bracket.

Now, however, the front of the model is completed. Two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plates 7, bent to shape, are attached by an Angle Bracket to Flanged Plate 2 to enclose the space above Flexible Plate 3, then a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 8, bent over at the top, is also secured to the Flanged Plate so that it projects a distance of two holes above the Plate. Two $\frac{1}{2}$ in. Pulleys with Boss 9 are mounted one on each of the securing Bolts to represent headlamps. The windscreen is a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Transparent Plastic Plate, edged by two $3\frac{1}{2}$ in. and two $2\frac{1}{2}$ in. Narrow Strips 10, the whole attached to Plate 8 by Obtuse Angle Brackets connected behind the Plate by a $3\frac{1}{2}$ in. Strip. A curved $4\frac{1}{2}$ in. Strip 11 acts as the bumper, being attached to

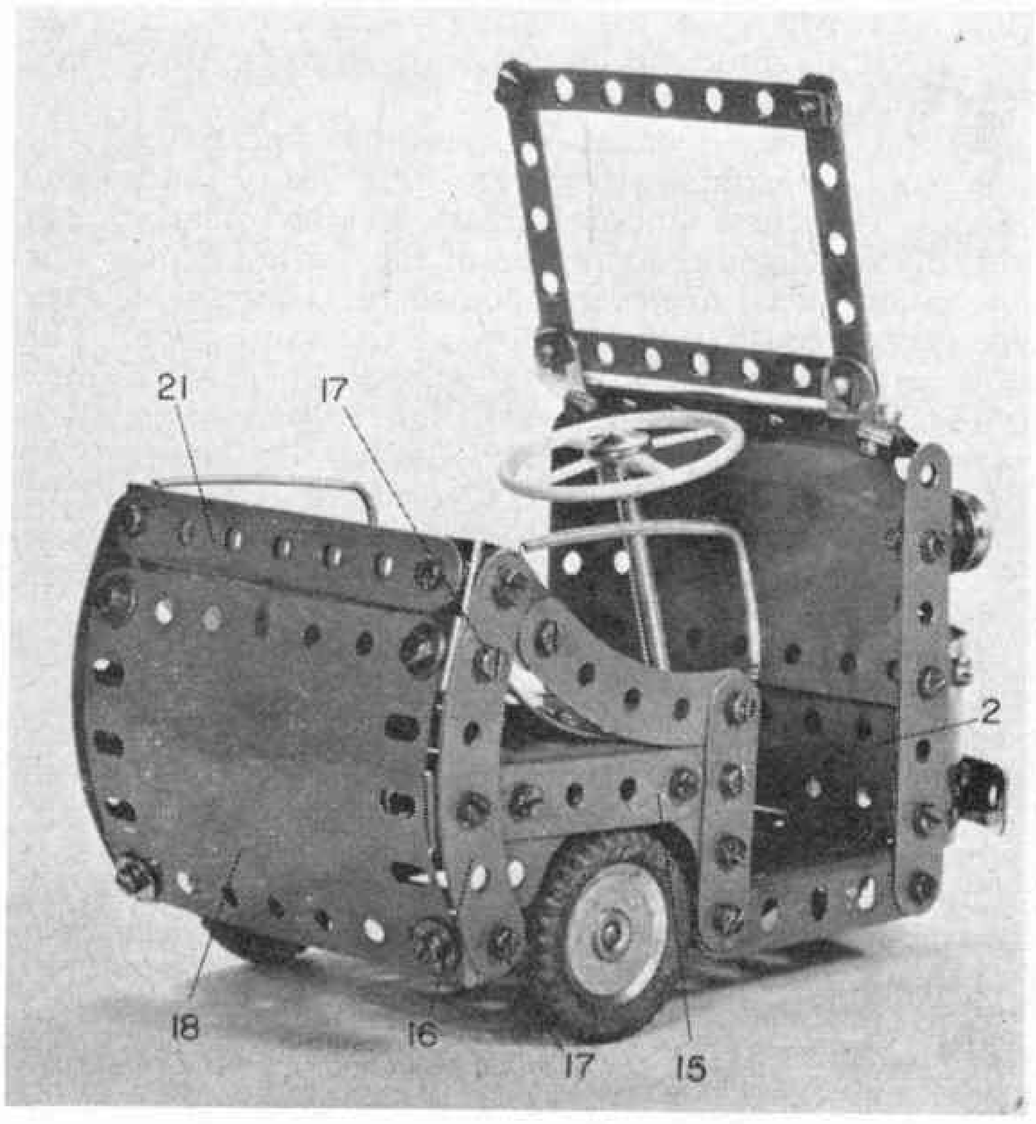


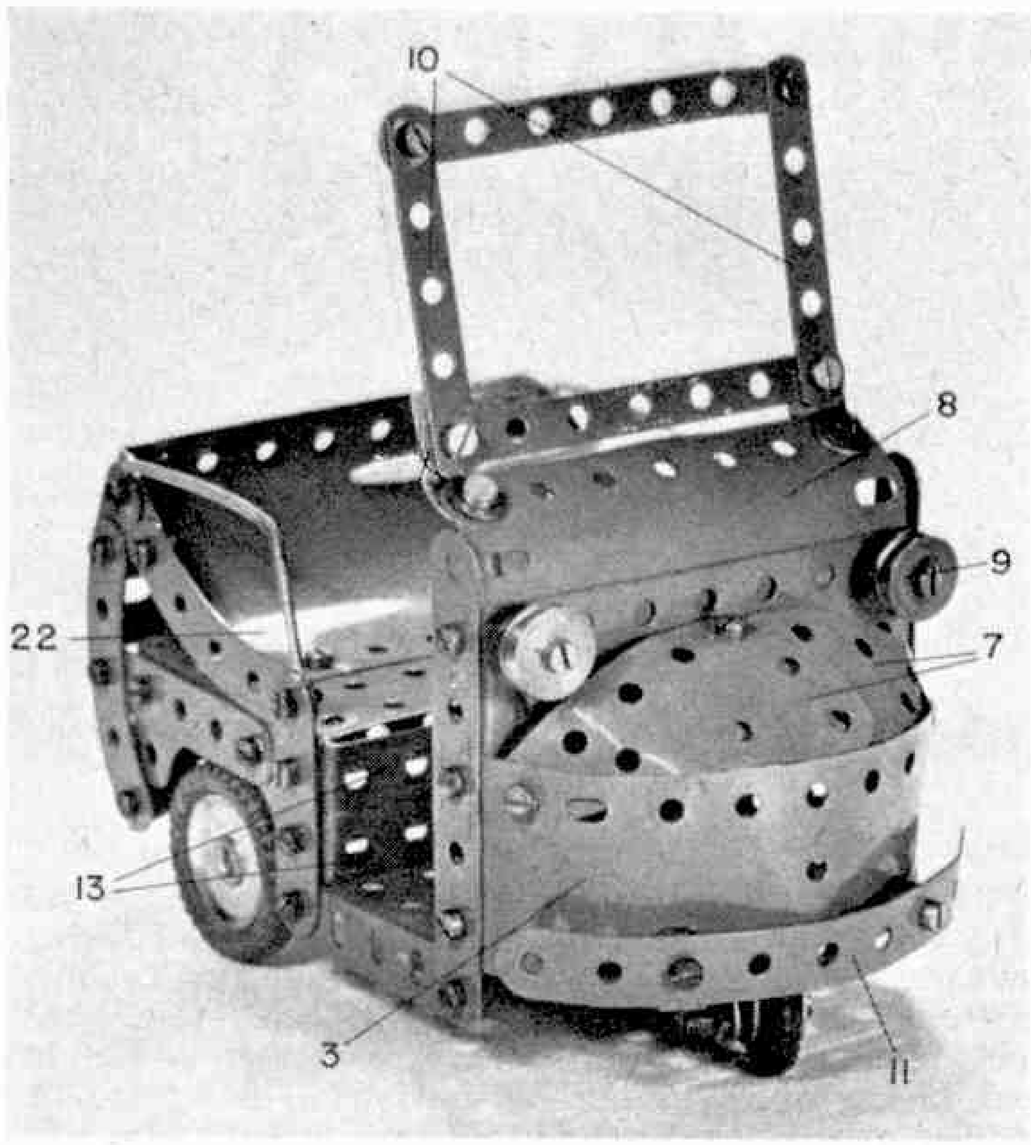
Plate 3 by two $\frac{1}{2}$ in. Bolts, Collars on the shanks of the Bolts acting as spacers.

A 2 in. Strip 12 is next bolted through the rearmost hole in each flange of Flanged Plate 1, Strips 12 at each side being connected by two $3\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 13. The Bolts securing the Double Angle Strips also hold in place a third $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate, 14, serving as the seat, and two 1 in. Corner Brackets, one at each side. A $2\frac{1}{2}$ in. Strip 15 is bolted to each of these Corner Brackets, another similar Corner Bracket being secured to this Strip half an inch from its opposite end.

Bolted to the end of Strip 15, as shown, is a 3 in. compound curved strip 16, built up from two $2\frac{1}{2}$ in. Strips overlapped four holes, the securing Bolt holding an Angle Bracket in place. Another two Angle Brackets are added, being held by Bolts 17, then a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 18, curved to shape, is bolted to all the Angle Brackets to enclose the back of the model. The top of Strip 12 is joined to the top of compound curved strip 16 by a $2\frac{1}{2}$ in. Curved Strip 19, extended by a Fishplate. At the same time, a short length of Spring Cord 20, bent as shown, is trapped in position to serve as a handrail. The Bolts fixing the Fishplates to curved strips 16 also hold in place two Angle Brackets joined by a $3\frac{1}{2}$ in. Strip 21 and a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Plastic Plate 22, the latter being curved and bolted to the centre of Flanged Plate 14.

Fixed to the underside of Flanged Plate 14 by the Bolts securing Plastic Plate 22 is a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Double Angle Strip 23. Mounted in the end holes in the lugs of this Double Angle Strip is a $3\frac{1}{2}$ in. Rod, on each end of which is secured a 1 in. Pulley with Motor Tyre 24, spaced from the adjacent lug by three Washers.

Finally, the steering mechanism is completed, the steering column consisting of a $3\frac{1}{2}$ in. Rod journalled in Flanged Plate 1 and in a Reversed Angle Bracket 25 bolted to the top of the Plate. It is held in position by a Collar situated above the Reversed Angle Bracket and beneath the Plate, by a Double Arm Crank 26, to one arm of which a $2\frac{1}{2}$ in. Strip 27 is lock-nutted. The other end of this Strip is lock-nutted to the free lug of Angle Bracket 6, then, last of all, a $1\frac{3}{4}$ in. Steering Wheel is mounted on the top of the steering column to finish off the model.



PARTS REQUIRED

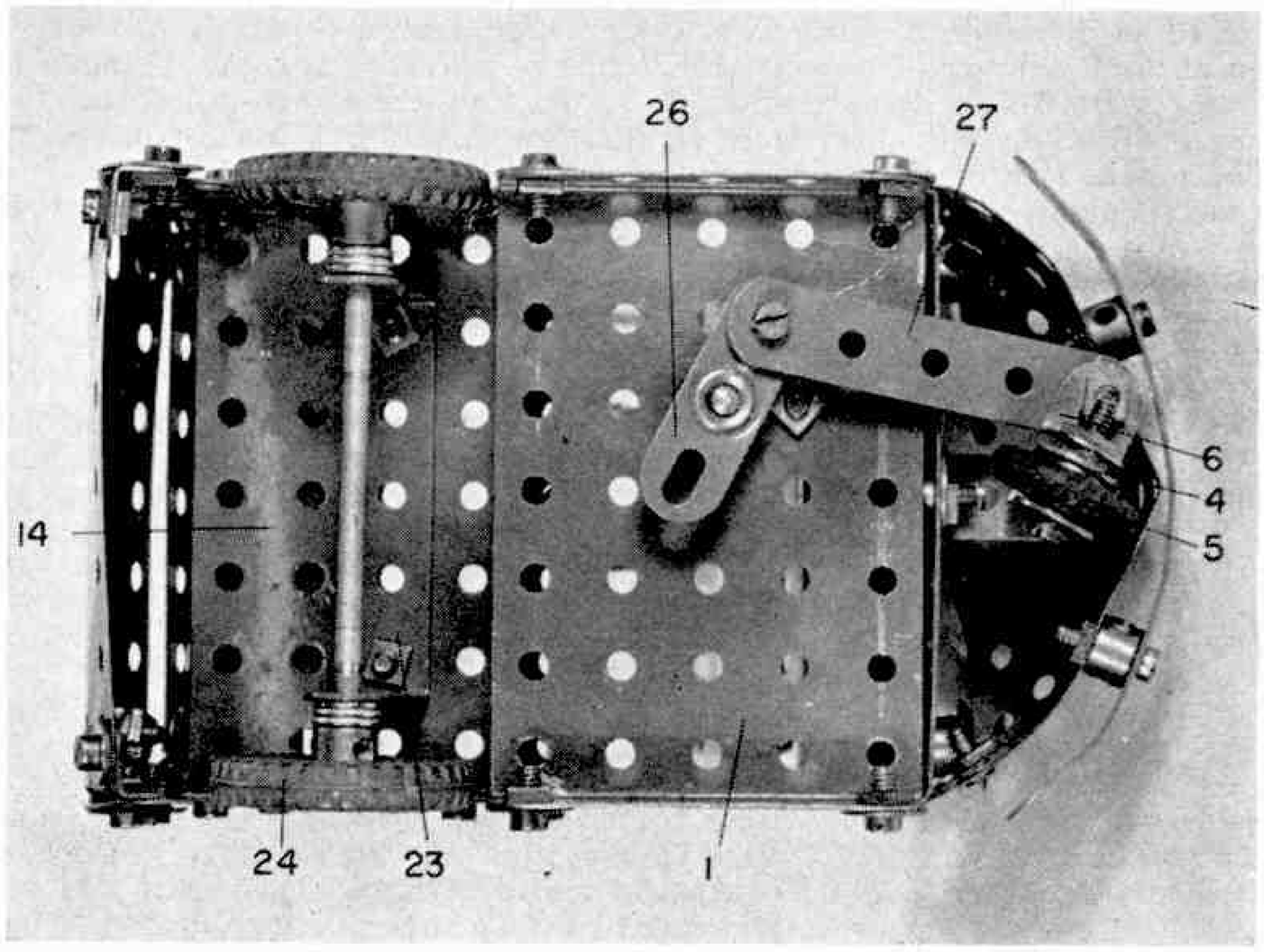
1—2a	1—23	3—59	1—185
3—3	2—23a	1—62b	1—189
3—5	61—37a	6—90	2—190a
2—6	53—37b	1—102	1—193b
2—10	15—38	3—111	1—194b
7—12	1—47	2—111a	2—221
2—12c	2—48b	1—125	2—235
2—16	3—53	4—133a	2—235b
2—22	6—58	2—142a	1—Dinky Toy Tyre

Above right: This little Meccano model of a commuter car, based on the Colliday Chariot, is simple in design, but high in realism.

Right: An underside view of the Commuter Car showing the layout of the chassis and the simplicity of the steering mechanism.

Above left: Comparatively few parts are used in the Meccano Commuter Car, yet the builder has managed to catch all the major lines of the original vehicle.

Left: A rear view of the model showing construction of the back and side. Note the use of Spring Cord for handrails.



SIR HARRY R. RICARDO

by

A. W. Neal

Great Engineers No. 18

THERE WERE many ingenious people connected with the development of the diesel-engine during its early stages, and the workable machine that eventually emerged was lacking in many aspects. The need for something much more compact, lighter in weight and higher in speed became obvious if it was to be applied generally to power problems. Scientific investigation into new materials to withstand higher duties, a break-away from conventional practices and a backing-up of practical experience was clearly desirable. Into this field stepped Sir Harry R. Ricardo.

Harry Ralph Ricardo was born in London in 1885 and was educated at Rugby School and Cambridge. His early interest in mechanical engineering, especially the then newly emerged internal combustion engine, led to his assisting Professor Hopkinson at Cambridge in his research work. In 1907 he joined a consulting engineering firm, and in the years before the outbreak of war in 1914 he acquired considerable experience over a wide engineering field.

During the 1914-1918 war the fighting vehicle on 'caterpillar' tracks, the tank, made its appearance. It had various defects, one of which arose from its petrol engine which did not furnish sufficient power. This led to an invitation to Ricardo to design and develop an entirely new prime-mover. His terms of reference were, apart from placing additional burdens on firms engaged on the war effort were an increase in power but not in size of the engine and that no visible oil smoke should be emitted whatever the circumstances.

Whilst he was serving with the consulting engineers he was brought into touch with several stationary engine builders, and he now turned to these and others to form a steering committee for the project, with Sir Albert Stern acting as chairman. Ricardo with the aid of a few draughtsmen produced the designs for a new tank engine, which in the event proved to be an outstanding success.

Following this he was appointed Consultant to the Air Ministry.

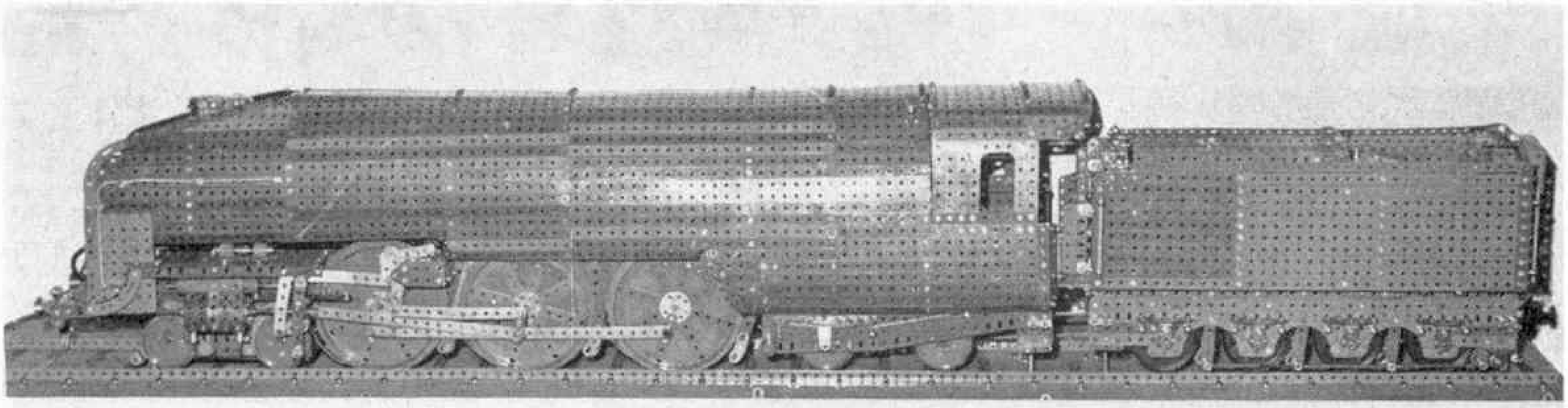
Sometime before the outbreak of war in 1914 Ricardo had fixed up in the garden of his home at Walton-on-Thames a small workshop and laboratory where he could carry out private research into engine design and on the behaviour of fuels. As a result of his work on the tank engine, and his consulting work, it became evident that greater facilities were needed. So, in 1918, a private syndicate, called Engine Patents Limited, was formed by Ricardo and a few friends, and a research establishment was set up at Shoreham-by-Sea, Sussex. Shortly after this the title of the firm was changed to include the name "Ricardo."

Here, after the war, Ricardo investigated many problems connected with engines and petrol, including the behaviour of the then known petroleum products which could possibly be used in a carburettor engine and also of a large number of basic substances which could be added to a marketable fuel to improve its resistance to detonation. All of this resulted in many changes in refining and marketing. The Shoreham laboratories grew steadily in size, and now some 200 people are employed there.

Other highlights of Ricardo's career are his work on the Triumph motor cycle engine and the three-litre Vauxhall racing engine of the early 1920's, both of which had overhead valves. During the 1920's his name became famous for the development of the so-called turbulent head for side valve engines. His interest in compression ignition engines resulted in the well known Ricardo "Comet" combustion system which since 1930 has been built into engines of all types.

But what of the man himself? He was elected to the Royal Society in 1929, he was President of the Institution of Mechanical Engineers in 1944-45, and he was knighted in 1948 in recognition of his work in the field of internal combustion engineering and research. He is an Honorary Member of the Institution of Mechanical Engineers and a Life Member of the American Society of Mechanical Engineers. Among his many awards are the James Watt Medal and the Clayton Prize of the I. Mech. E., and the Lanchester and the Crompton Medals of the old Institution of Automobile Engineers. The American Society of Automotive Engineers awarded him their Horning Medal, and the Institution of Civil Engineers gave him their Ewing Medal.

Over the years he has contributed many papers to various learned societies here and abroad and is well known as the author of a classic work on the internal combustion engine.



MECCANO REPORT

by Spanner

IN THE January issue of *Meccano Magazine* we were pleased to be able to give details of a visit made by representatives both of the Magazine and of Meccano Ltd., to the Annual General Meeting of the Midlands Meccano Guild. We have since been informed by Bert Love, Guild Secretary, that interest in the Guild is multiplying rapidly and that he is receiving enquiries not only from all over Britain, but from other countries throughout the world. We hope that we have been partly responsible for this interest because the Guild, in our opinion, is a first-class organisation for serious Meccano enthusiasts and we would like to think that we have helped towards its success.

Anyway, the meeting on which we reported, while being the *first* A.G.M., was, in fact, the *third* official meeting of the Midlands Meccano Guild and, in March this year, the fourth official meeting was held at Stratford-on-Avon with members travelling to it from far and wide. In view of the interest which the Guiid has created, we are pleased to give below a condensed version of the official report of this meeting. Our thanks go to the Secretary for permission to publish it.

MIDLANDS MECCANO GUILD
4th Guild Meeting
Held at: The St. John Ambulance Hall,
Western Road, Stratford-on-Avon

Saturday, March 22nd, 1969

The Guild's Fourth Meeting produced a record attendance both in terms of Members and Visitors and the number and range of models was better than ever.

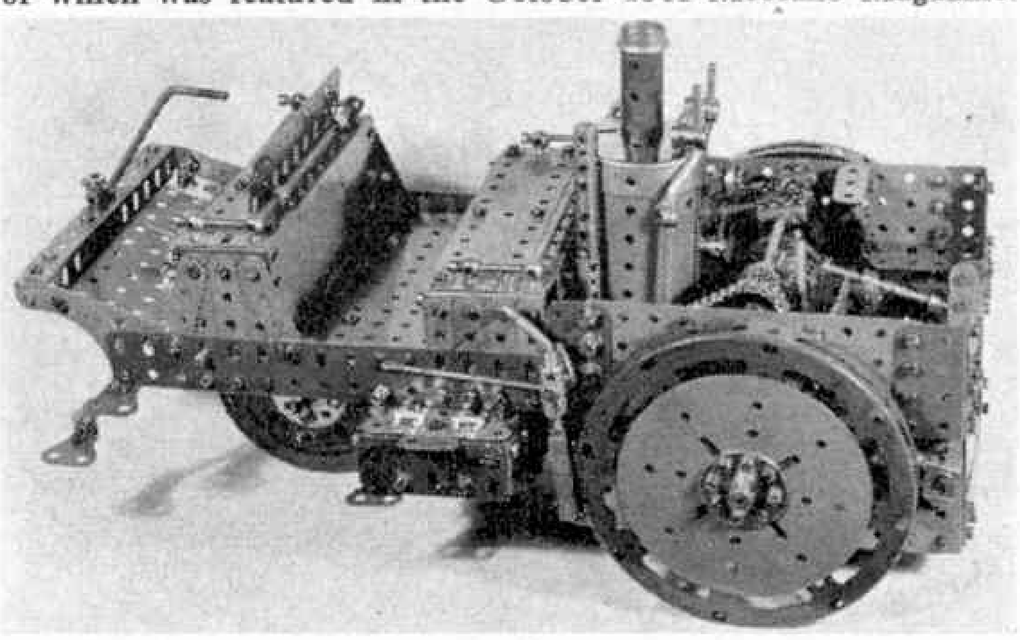
At ten minutes past two the Meeting began with a series of short discussions on individual models or mechanisms. The Secretary opened by welcoming new Members and guests and then went on to speak briefly about the self-centring roller-bearing and ladder construction on a Block-setting crane before giving a short demonstration of Ulysse Bachelard's Plate Bending Machine which was illustrated in a recent issue of the M.M. Ron Fail followed this by demonstrating a simple weighing balance employing a linear parallelogram displacement based on the elasticity of four 12½ in. Perforated Strips, direct scale reading being operated by simple rack and pinion drive. Ron also demonstrated a Spiral Harmonograph which not only produced a Spiral but also made the looping patterns of continuously increasing amplitude similar to the ramshorn or fossil ammonite configuration. The model was driven by a Power Drive Unit running from 4½ volt dry batteries and it produces beautiful spiral designs of infinite variety.

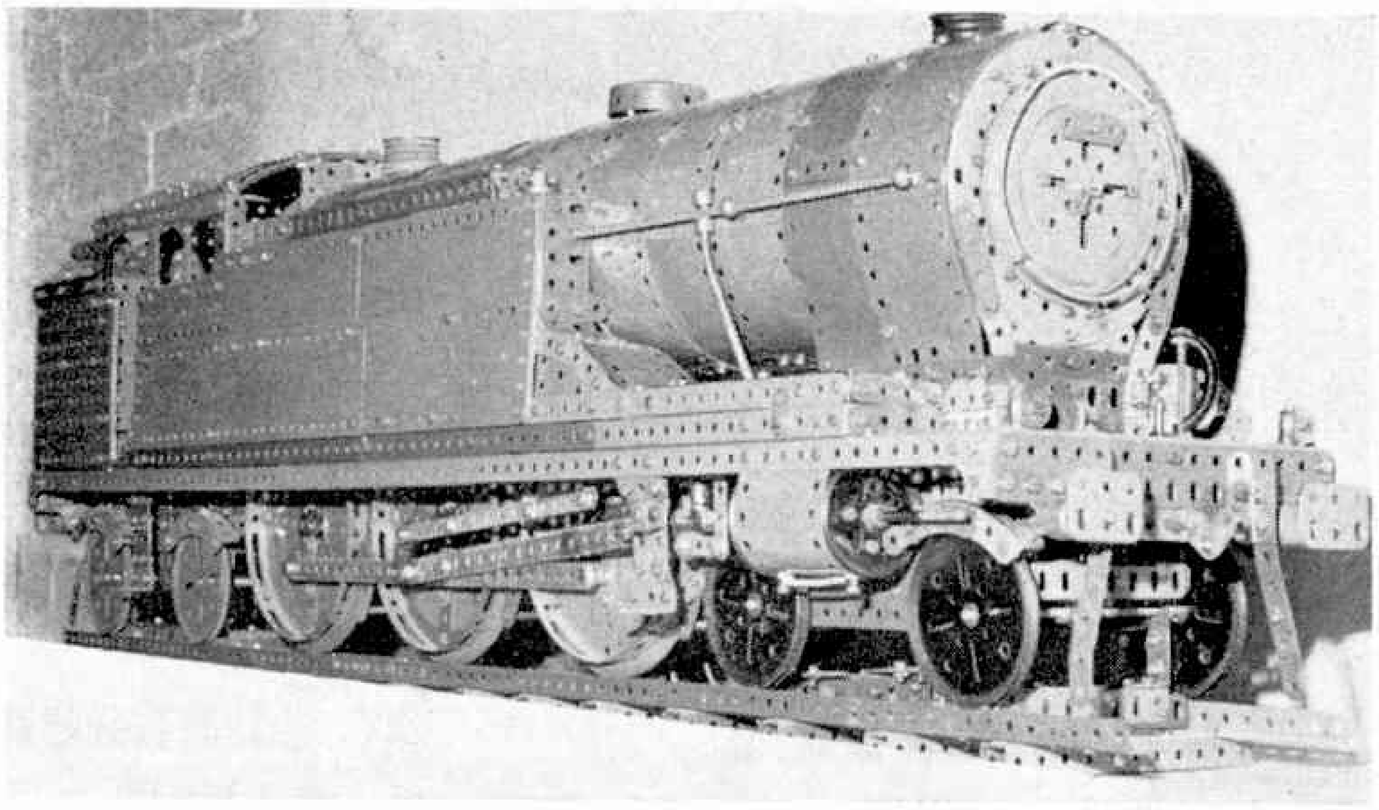
Ernie Chandler then showed his model Landrover which was almost big enough to accommodate Ron Fail's model in its spacious dimensions. The general outlines of the prototype had been carefully reproduced and the mechanical complexity of the Landrover had been tackled by Ernie in a very workmanlike manner. Front and rear differentials were included with gearbox, clutch and disengage drive to front axle. Special attention had been given to reproducing spring shackles of scale and realism. Ernie intends to carry out further work on his Landrover to improve steering efficiency—not an easy task when front wheel drive is involved.

Phil Bradley demonstrated three simple mechanisms suitable for inclusion in a popular range of Meccano Models. The first showed an improved travelling bogie for a rail-mounted Dragline, developed from an original Super Model Leaflet. Flanged wheels were doubled up, gear drives were arranged internally instead of externally, the second axle was given float action to ensure 'tricycle' load distribution and the pivot bearing was "ball and socket" type, being a Handrail Coupling riding in a Socket Coupling. The new design of bogie gives a 50% increase in efficiency. Phil's second mechanism was the gear-box from his Scammell Contractor lorry featured in M.M. last year. This was a good attempt at constant mesh with non-sliding lay-shafts, gear engagement being provided by sliding dogs. This necessitated drilling a 50-teeth

Above: Another contrast in period styles is provided by the massive model of the L.N.E.R. 1,000 Locomotive built to the original Meccano Building Instructions by Len Wright of Brough, Yorkshire.

Below: Dr. David Whimore of Bexley, Kent, built this fully detailed replica of the 1875 Grenville Steam Carriage, the original of which was featured in the October 1941 Meccano Magazine.





Left: A freelance scale model 4-6-4 Prairie Tank Locomotive built by Ralph Clark of Bath. Note the realistic use of flexible plates on the tank locomotive as opposed to perforated strip construction of the older locomotive on the previous page.

Below: This strikingly detailed model of a Leyland double decker bus, built by Brian Edwards of Bedford is in marked contrast to the one opposite which is the original Prize Winning Model of a 1914 London Omnibus built in the original nickel parts of the early competition period, and exhibited at the Guild meeting by Peter Matthews of East London.

gear to provide sliding pin connection. His third mechanism was an attempt at a servo brake for a crane winding drum. This was intended to be controlled by the crane load itself spinning the hoist barrel with a grooved pulley being checked by a servo loop of Nylon cord on a following servo brake drum. Phil wasn't satisfied with the control afforded by Nylon and suggested experiments with a wire loop instead.

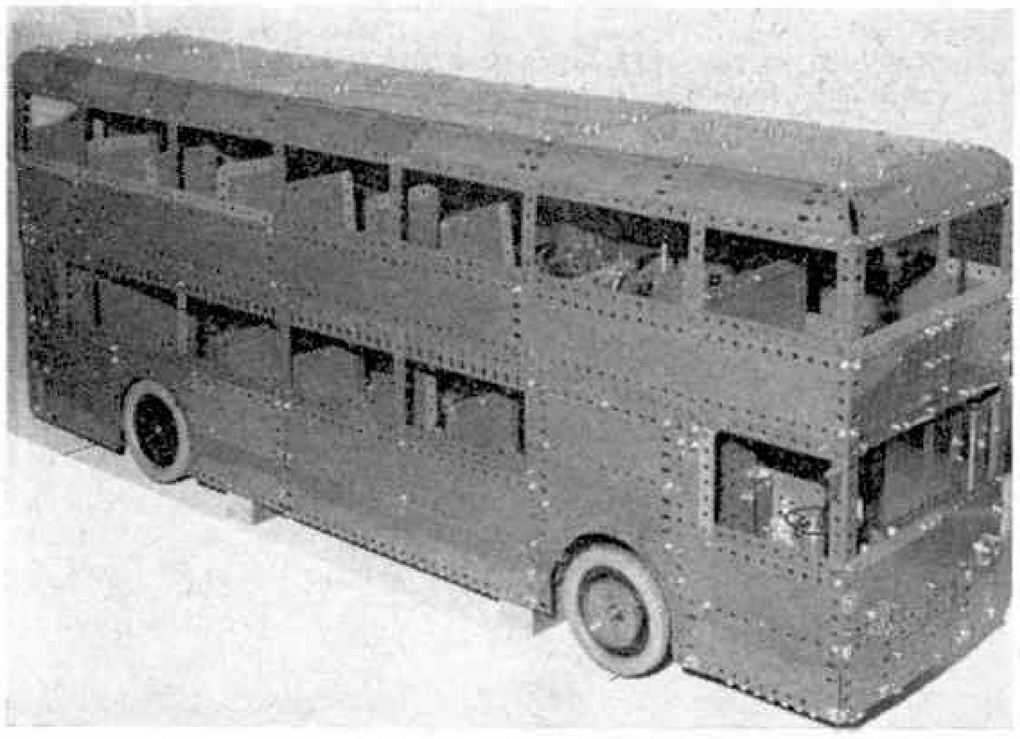
Jim Gamble then demonstrated a 'period' model of a working digger/shovel. This was a remarkable model built from genuine nickelled parts in first-class condition of the early 1920's, a period when much of the sophisticated Meccano parts and gears were still to come. The model was powered by the rare 3-spindle Clockwork Motor of the 1910-20 period and the motions of travelling, slewing, racking and digging were all provided for. Jim had made a careful choice of parts from his wide collection of early items and had achieved an excellent combination of 'period' appearance with optimum use of the simple mechanisms available at the time. He is to be congratulated on the skilful model-building and originality of design. Jim also provided two further models for general exhibition in the shape of two Royal Navy Destroyers of First and Second World War fame. One was a 1914 'Flush decker' with four vertical smoke-stacks (making use of the early and obsolete straight Ship's Funnel) together with rudimentary armament of the period. The second model, of the Tribal class, showed the radical changes in Destroyer design over a 15 year period with high fo'c'sle, raked stem, raked funnels and increased fire-power. Details included Carley rafts, ship's boats, deck fittings, torpedo tubes, anchors and cables, all of which were very expertly modelled by Jim.

At this stage, the brevity of some talks had left the Meeting with a few minutes in hand which were added to Phil Ashworth's time and he continued the talks by demonstrating several models and mechanisms which he explained in detail. As the electrical control systems were somewhat involved, it is hoped that a fuller explanation will be published in the next "Gazette" (official organ of the Midlands Meccano Guild).

Phil's principal model was a programmed contra-rotating Double Arm Fairground Wheel which he presented in embryo form at the last meeting. The main rotating arm carried a six-cupola wheel at each of its extremities and these were programmed to be loaded in correct order by skilful use of gear ratios and electrically-controlled sequencing. Mechanical drives were by Power Drive Unit which in turn was controlled by a small Japanese motor for its switching sequences. Solenoid-operated barrier gates allowed access to one cupola at a time and returned to safety state on motion commencing. When all cupolas were loaded in both wheels, the model ran for a pre-determined length of time before going through the 'unloading' sequence.

Phil next demonstrated a 'potted' clock-striking mechanism confined to a $3\frac{1}{2}$ in. cube. This also included a Japanese motor replacing a noisy Emebo Motor, which carried out the function of priming the strike mechanism two minutes before the hour and then operating the bell striker on the hour. Paired commutators were employed to give the time lag between priming and striking and the motor operating switches were ingeniously constructed in a very small space from a Coupling, Centre Fork and Elektrikit parts. The 'cube' was equipped with clock dial and hands with appropriate reduction drive to the hour shaft. It passed the critical test—changing over from a strike of 12 o'clock to one o'clock—with no hesitation. Phil finally displayed his compact three-speed and reverse gate-change gear box which was featured in April's M.M. It was beautifully compact and as smooth as silk, both in running and gear changing.

The final set demonstration of the afternoon was given by Clive Hine who demonstrated two excellent Fairground models. His 'Cakewalk' oscillated in approved giddy fashion and was fully illuminated by a mass of low-voltage coloured lamps and three 12 Volt car headlamp bulbs. The model was complete with



green and white striped canopy, carefully prepared by Clive for the Stratford Mop Needlework Competition.

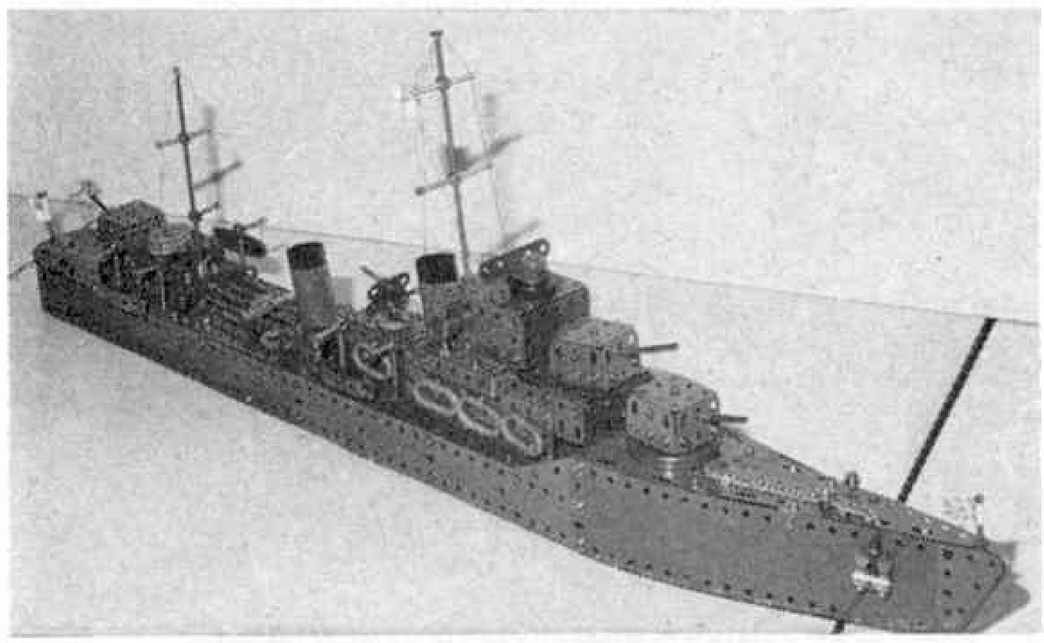
His second model was a first-class replica of the fairground 'Satellite' complete with rotary tilt and planetary motions. Large diameter roller bearings were provided by 167b Flanged Rings and ½ in. Pulleys. The main rotary drive was via a 2 in. Sprocket Wheel meshing with a ring of Sprocket Chain making a tight fit over the flange of the 167b. The planetary drive on the tilting platform was via a rubber friction drive provided by 1 in. Pulleys fitted with Motor Tyres, bearing against the rim of another 167b. Ram hoist for the tilt was simulated by a rotating Screwed Rod with aditional guides provided by axle rods passing through a Boiler acting as the ram cylinder. Cut-out and limit switches were provided and, as usual with Clive's models, everything worked in a remarkably realistic manner.

At this stage the individual talks were concluded and Members were invited to go roaming among the exhibits which were many and various. Quite a few of the previous models were on show, by popular request, for a second time, simply because Members had not had sufficient time to look at them in detail. One of the most novel of the smaller exhibits was provided by David Whitmore who made an excellent reproduction of the Grenville Steam Carriage, featured in prototype in the October 1941 *Meccano Magazine*. The realism of reproduction achieved by David may well have been missed by a number of Members not familiar with the original article but the mechanical aspects of the gearing, springing and differential are so interesting that they are well worthy of an M.M. illustrated article.

Eric Jenkins, a new Member from Kent, brought along the Super Designing Machine originating from Andreas Konkoly of Budapest which produces exquisite tracory in its pattern. Eric also showed a second Designing Machine with his own modifications for producing a cross-slide drawing table to provide patterns with rectilinear axes. Brian Edwards from Luton, another new Member, produced a beautifully modelled, near-scale double decker Leyland 'Titan' Omnibus. This was fully fitted, beautifully plated externally, rugged in construction and complete with fully-detailed rear-mounted transverse engine in inspection compartment, gear-box with linkage to cab control, differentials, clutch, etc.

Len Wright, another new Member, from Brough, Yorkshire, brought two of the 'old faithfuls' in the form of the Twin Cylinder Horizontal Steam Engine and the L.N.E.R. 1,000 Locomotive. Wilf Bollard showed a modified S.M.L. 19, Steam Shovel with Weather canopy, and Dennis Perkins brought along his own multi-power-unit version of the Giant Block-setting Crane.

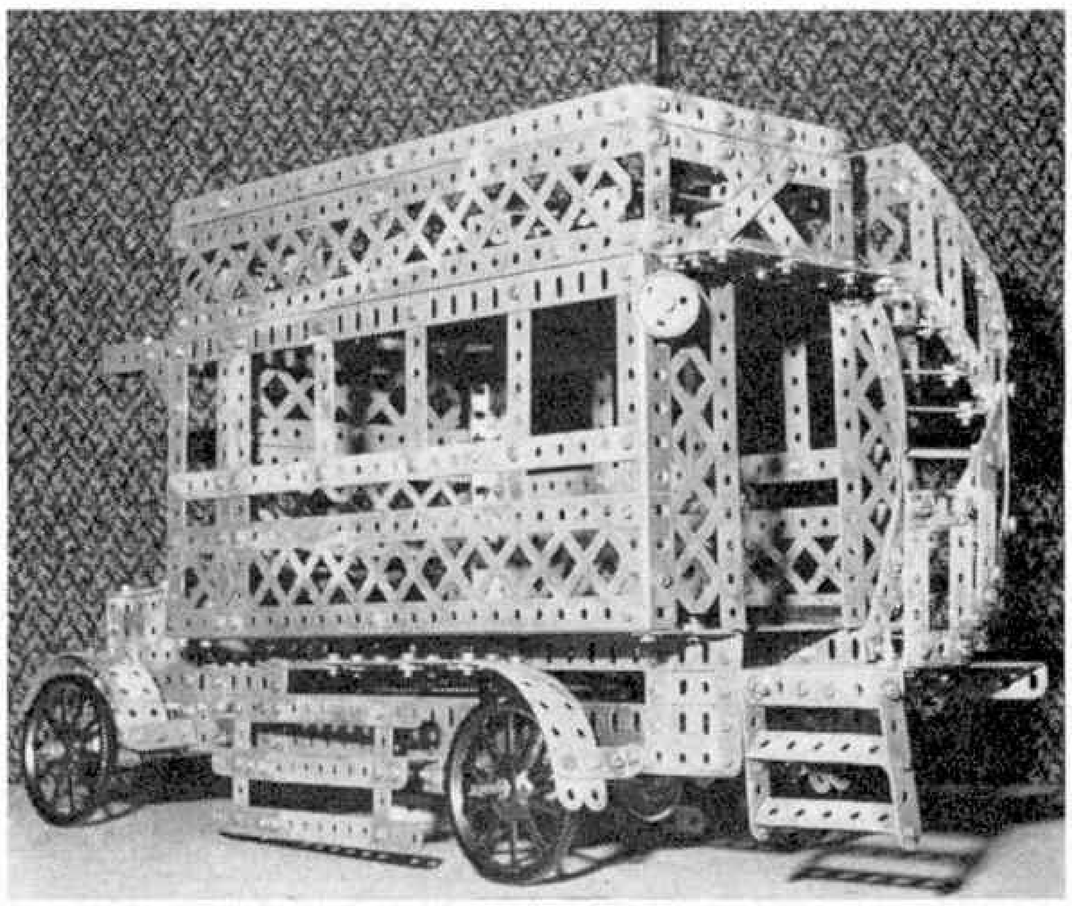
Paul Brecknell, a new Member from Shirley, Warwickshire, displayed the M.M. Pontoon Crane and Pat Briggs showed his electric clock with Lunar movement driven by a synchronous motor—the first synchronous motor to be made by a Guild Member from current Elektrikit parts. Ralph Clark brought his Baltic Tank Locomotive for a second visit and Esmond Roden brought the Southern Region Electric Rail Coach. Apart from his hand loom and M.M. Pontoon Crane he showed a very neat Cable Car Railway built from the contents of the new No. 7 Outfit in yellow, silver and black. Alf Hindmarsh showed the S.M.L. Steam Excavator built in pre-war blue and gold parts, complete with genuine pre-war Meccano Steam Engine. He also had a plane built from the pre-war Aero Constructor Outfit.



Jim Gamble of Nottingham produced this second World War Destroyer with excellent lines and proportions from a minimum number of parts.

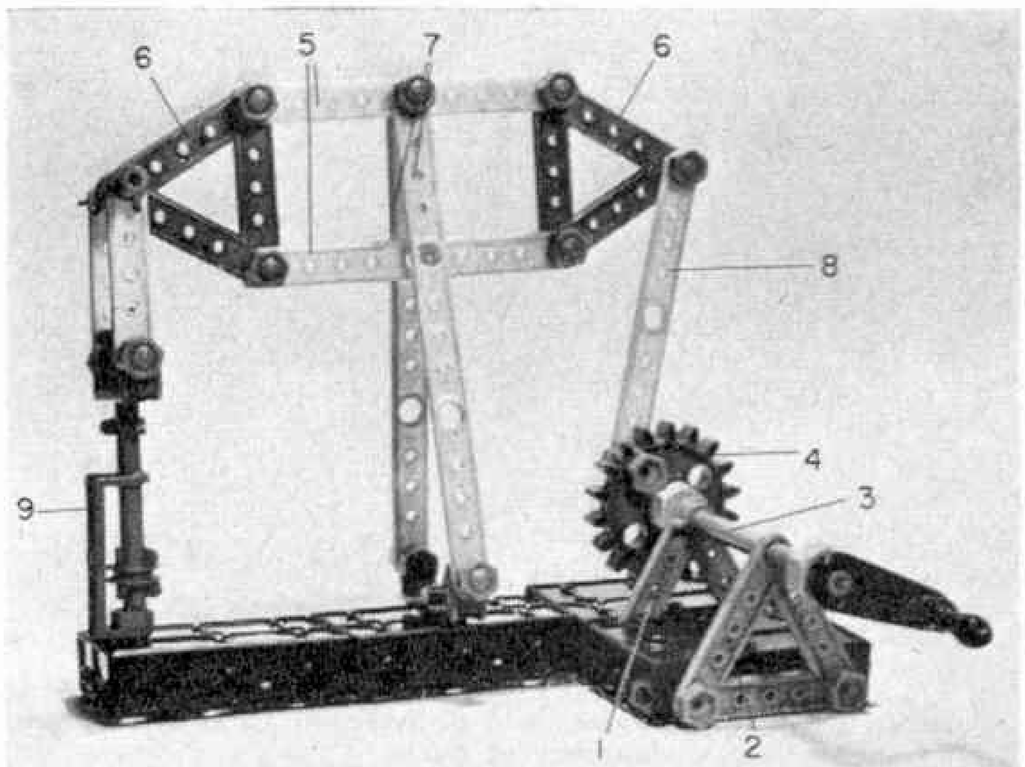
Roger Lloyd produced an excellent conversion of the original S.M.L.1., Meccano Motor Chassis, by building a sporting/racy bodywork from flexible plates, mounted on the original chassis. This was complete with exhaust system, fuel line, petrol tank, external hand-brake, claxon horn, mirror, lamps, windscreen and radiator mascot. David Goodman showed a version of Ron Fail's earlier electric clock and brought a specimen of a mains motor of high power and silent action. Peter Matthews, a new member from London, showed the working basis of a fairground galloper working on an undulating platform constructed from plastic plates and driven from below by moving Emebo motors. He also showed some interesting early Meccano products of historical interest.

Free roaming continued among the Members until 4.30 p.m. when tea was served by the volunteer band of wives, Betty Love, Nellie Perkins, Margery Taylor and Barbara Wright. Members took as much advantage as they could of examining the other man's models and exchanging ideas. Even the Secretary had a chance to see some of the models and to speak to some of the Members—a luxury not always possible with the demands of the programme on his attention—and I am sure that Members appreciated the extra allocation of time for general circulation among the models and modellers.



A BEAM ENGINE IN PLASTIC MECCANO

by Spanner



A simple Beam Engine built with Plastic Meccano. This is an outstanding model in view of the fact that it was designed by a 6-year-old, Mark Harding of West Bromwich, Staffordshire.

SIX-YEAR-OLD Mark Harding of West Bromwich in Staffordshire is obviously a young man of tremendous mechanical ability or, at least, of tremendous potential ability, if the simple Plastic Meccano model illustrated here is anything to go by. I say this because the model illustrated is only a very slightly modified version of an original model, representing an old Beam Engine, which was designed and built entirely by Mark and I think you will agree that it is something for which he should be heartily congratulated.

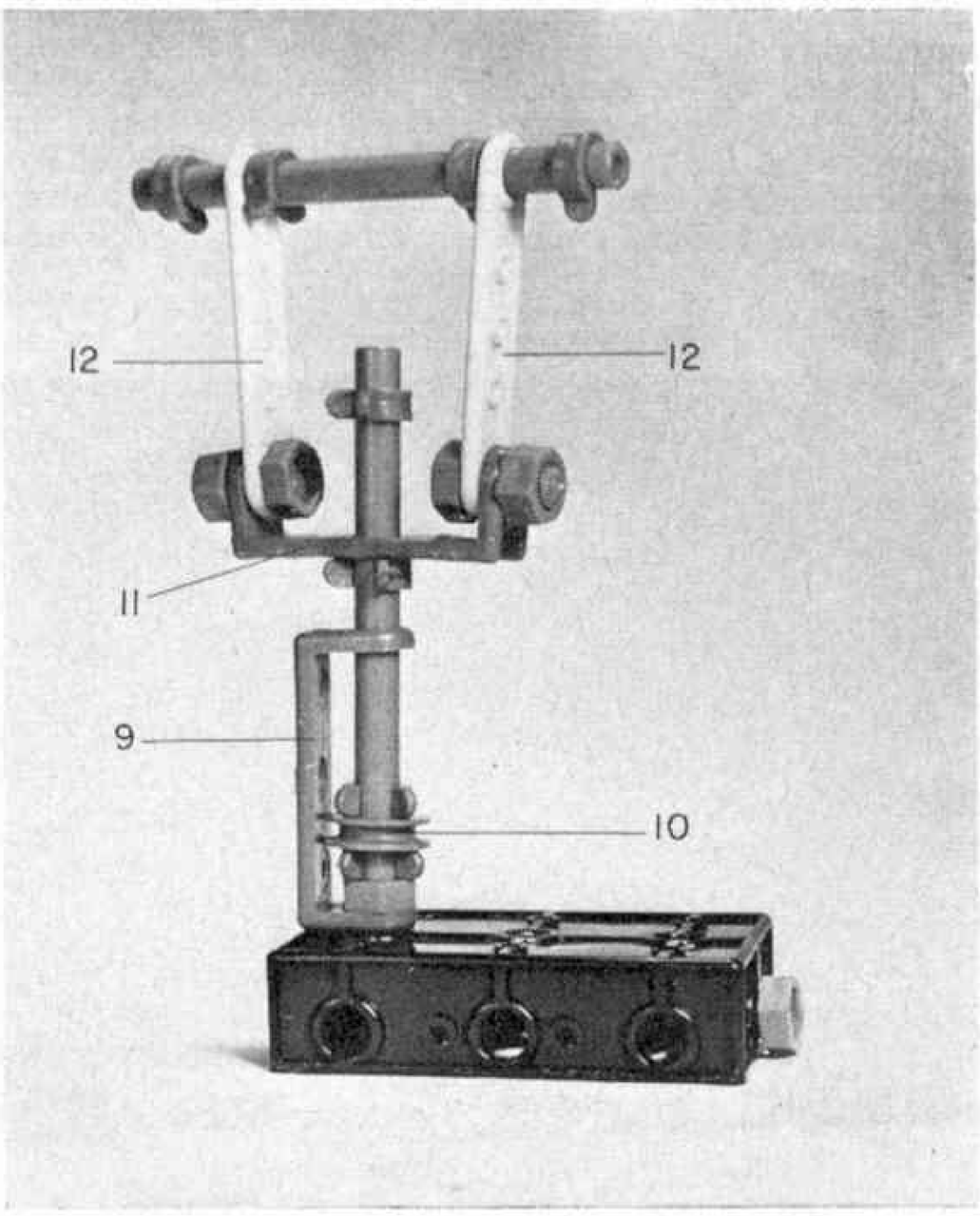
The model, itself, is amazingly realistic, despite being very simple in design, and it has the added advantage of being entirely different to anything shown in the instructions leaflet packed with the Plastic Meccano Sets. The bed of the model consists of four Bases, three fixed end to end and the fourth bolted to the side of one of the end Bases, with a 2-hole Triangular Girder 1 being secured between them. Another similar Triangular Girder 2 is bolted to the outer side of the fourth Base, the apex holes of the two Girders then providing bearings for a 6 in. Axle 3, held in place by an Axle Clip and an 18-teeth Gear Wheel 4. A Handle is mounted on the outside end of the Axle.

In the case of the actual beam, this is built up quite simply from two 3-hole Strips 5, connected at each end by a 2-hole Triangular Girder 6. Pivotally attached to the centre of upper Strip 5 by a 1 in. Bolt are two 4-hole Strips 7, the lower ends of which are bolted to the lugs of a Double Angle Strip fixed to the centre of the three in-line Bases.

Another 1 in. Bolt is now held, by an Axle Clip, in a hole in the face of Gear Wheel 4. A 3-hole Strip 8 is added to the Bolt, followed by a Nut which should be tightened sufficiently to prevent the Strip coming off the Bolt and yet not so tight that it prevents the Strip turning on the Bolt. The upper end of Strip 8 is pivotally connected to the apex of nearby Triangular Girder 6.

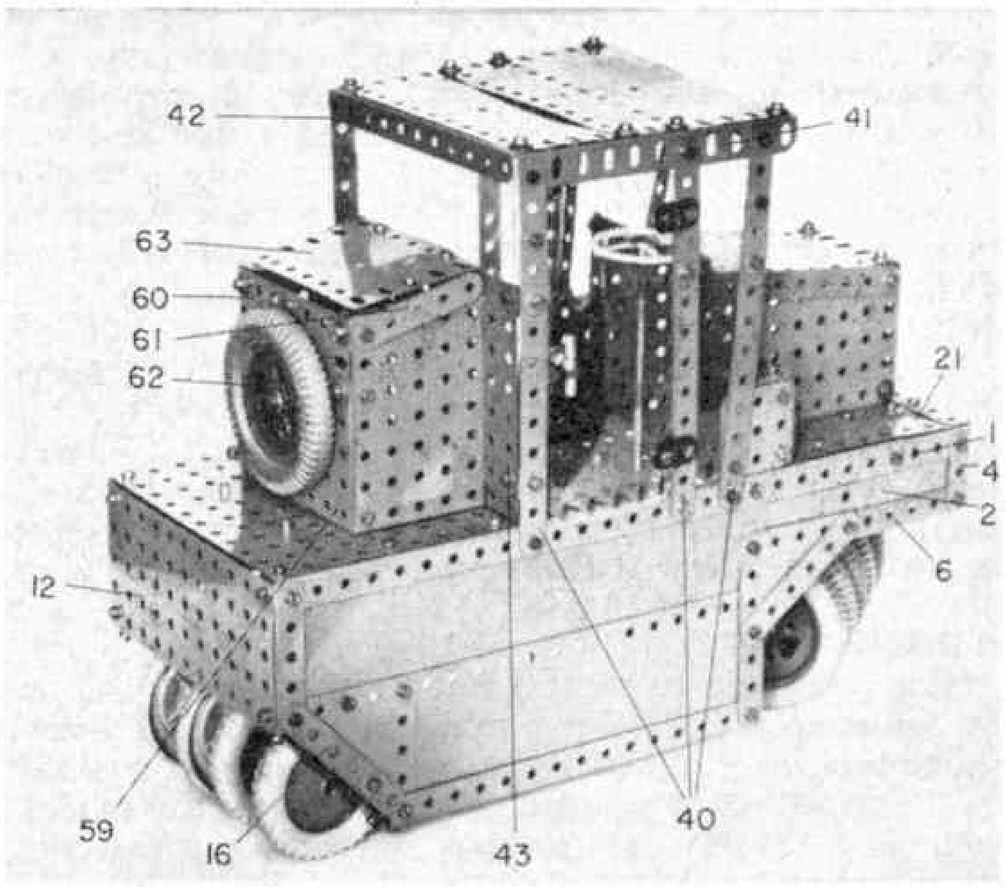
Coming to the cylinder and piston, these are represented by a Double Angle Strip 9, through the upper lug of which a 4½ in. Axle is inserted. A Pulley Wheel 10 is held by Axle Clips on the lower end of this Rod, while, towards the top, another Double Angle Strip 11 is also held by Axle Clips. Tightly fixed to each lug of the latter Double Angle Strip is a 2-hole Strip 12. Passed through the upper holes of these Strips and the apex hole of remaining Triangular Girder 6 to complete the model is a second 4½ in. Axle, held in place by Axle Clips at each side of the Girder and also outside the Strips.

A view of the piston and connecting rod removed from the model to show their construction.



PARTS REQUIRED

2—2-hole Strips	1—Pulley Wheel
3—3-hole Strips	10—Axle Clips
2—4-hole Strips	2—4½ in. Axles
4—Bases	4—2-hole Triangular Girders
17—Bolts	1—6 in. Axle
2—1 in. Bolts	1—Handle
19—Nuts	1—18 tooth Gear Wheel
3—Double Angle Strips	



A rear general view of the Road Roller from which the layout of the cab structure is evident. Note the spare wheel for the front roller.

Wheels instead of solid rollers make this model described by Spanner a . . .

ROAD ROLLER WITH A DIFFERENCE

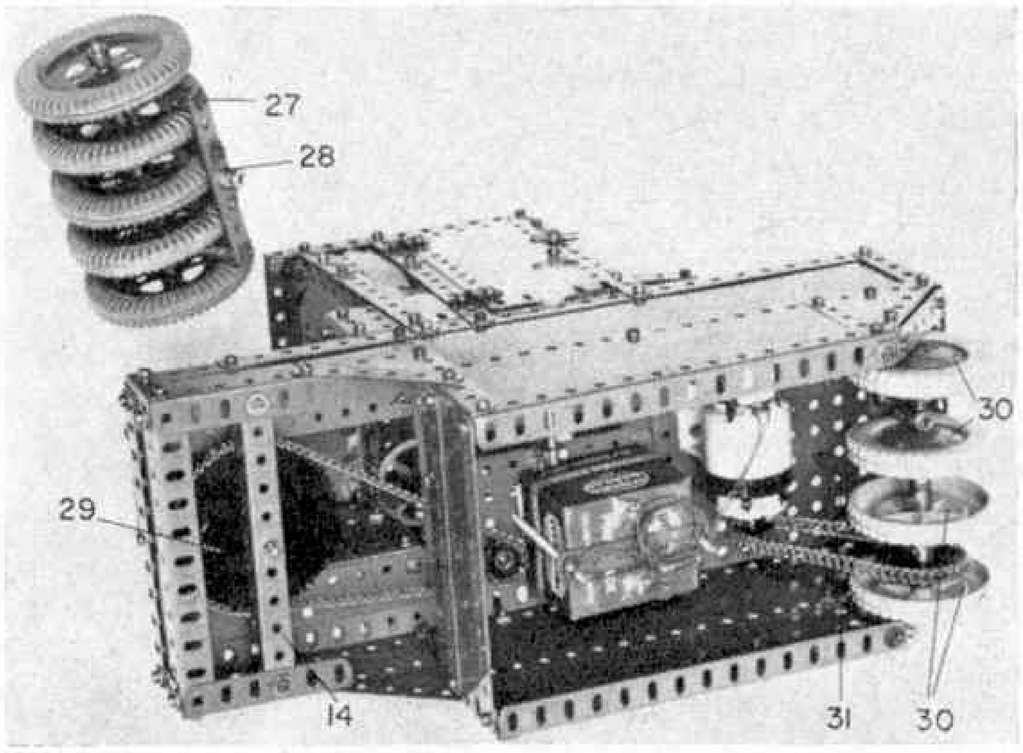
USED MAINLY by civil engineering contractors, these new machines are a lot different in appearance to traditional rollers and, in fact, perform a slightly different job as they are intended more to compact unsurfaced ground than to tightly compress a finished surface or under-surface. In view of the difference, I am surprised that nobody has come up with a Meccano model of the machine before now. It makes an excellent modelling subject as was brought home to me when I saw the model described here.

Based on a machine manufactured by Blaw Knox, this model operates extremely well, driven by a Power Drive Unit controlled from the cab. The front rollers are fully steerable, these also being controlled from the cab. No separate chassis is incorporated in the model, but a good, strong body is built up to provide a rigid mounting for the rollers and superstructure. Each side of the body consists of a 14 in. compound angle girder 1, produced from one 12½ in. and one 2½ in. Angle Girder, to which are bolted a 5½ × 1½ in. Flexible Plate 2 and a 9½ × 2½ in. Strip Plate 3. The forward Bolt fixing Plate 2 to the girder also secures a 1½ in. Angle Girder 4 to the end of the girder, while the rear Bolt fixing Plate 3 also secures a 2½ in. Angle Girder 5 to the opposite end of the same girder. A 3 in, Angle Girder 6 is bolted to the lower end of Girder 4, then the side is completed, as shown, by a 2½ × 2 in. Triangular Flexible Plate 7, a 7½ × 2½ in. Strip Plate 8 and a 2½ × 2½ in. Triangular Flexible Plate 9. Plates 7 and 9 are edged by 3 in. Strips, whereas Plate 8 is edged by a 2 in. Angle Girder 10 and a 7½ in. Angle Girder 11.

The two sides are now joined, at the rear, by a 5½ × 2½ in. Flat Plate 12, bolted between Girders 5 and, at the front, by two 5½ in. Angle Girders 13 bolted, along with a 5½ × 1½ in. Flexible Plate, between Girders 4. Another 5½ in. Angle Girder 14 is bolted to Girders 6, while Girders 10 are joined by a 5½ × 2½ in. Flexible Plate 15 overlayed by two 5½ in. Strips positioned one at the upper and one at the lower end of the Girders. The horizontal flange of each Girder 11 is extended rearwards and upwards by a 3 in. Strip 16, attached by an Obtuse Angle Bracket, the other end of this Strip being fixed to Flat Plate 12, also by an Obtuse Angle Bracket.

Turning to the top of the body, the horizontal flanges of girders 1 are joined by two 5½ × 2½ in. Flat Plates 17, overlapped one hole, a 5½ in. Angle Girder 18 and a 5½ in. Strip 19. Strip 19 is connected to upper Angle Girder 13 by two 5½ in. Strips 20, fixed through the third holes from each end of the Strip and Girder, the securing Bolts also helping to fix two 5½ × 1½ in. Flexible Plates 21 in place. Angle Girder 18 is also connected to Strip 19, this time by a 4½ × 2½ in. Flat Plate 22 and two 2½ × 1½ in. Plastic Plates 23 overlapped one hole. Note that Plates 23 are separated from Plate 22 by a space of half an inch. This space is most important as the motor operating lever will later project through it. Strips 20 are joined through their fourth holes from the front by a 3½ in. Strip, the securing Bolts helping to fix two 4½ in. Angle Girders 24 to the top of Strips 20, the 3½ in. Strip being secured to the undersides of Strips 20.

In this underside view of the model, the front roller has been removed to show the steering linkage, using Sprocket Wheels and Chain.



Rollers and drive

At this stage the rollers should be built up and mounted in their respective positions. The front roller consists of five 2 in. Pulleys 25, each fitted with a Motor Tyre, all mounted free on a 5 in. Rod where they are held in place by six Collars and two Couplings 26, these Couplings being situated between the first and second Pulleys at each end of the Rod. Note that the Rod passes through the lower end transverse bores of the Couplings to leave room for two 1½ in. Rods fixed one in the longitudinal bore of each Coupling. A Rod Socket 27 is secured on the upper end of each Rod, these Sockets then being connected by two 3½ in. Strips placed one on top of the other. Bolted to the centre of these Strips is a Double Arm Crank 28, in

the boss of which a $3\frac{1}{2}$ in. Rod is tightly held. This Rod is journalled in the centre holes of Angle Girder 14 and the $3\frac{1}{2}$ in. Strip joining Strips 20, where it is held in place by a Collar above the Strip.

Mounted on the Rod between the Girder and the Strip is a 3 in. Sprocket Wheel 29 which will later be connected by Chain to a $\frac{3}{4}$ in. Sprocket Wheel fixed on the end of the steering column. However, as this cannot be done until the cab has been built, it is advisable to construct the rear roller next. This consists of four $2\frac{1}{2}$ in. Road Wheels 30 fixed, along with a $1\frac{1}{2}$ in. Sprocket Wheel and two Couplings, on a $4\frac{1}{2}$ in. Rod. As in the case of the front roller, the Couplings are situated between the first and second Wheels at each end of the Rod, the Rod itself passing through the lower transverse bores of the Couplings. The Sprocket is mounted between the right-hand Coupling and the outside Road Wheel.

Fixed in the longitudinal bore of each Coupling is a 4 in. Rod 31 mounted in rear Flat Plate 17 and in a $5\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 32 bolted between the sides of the body. Collars each side of the Double Angle Strip hold the Rods in place.

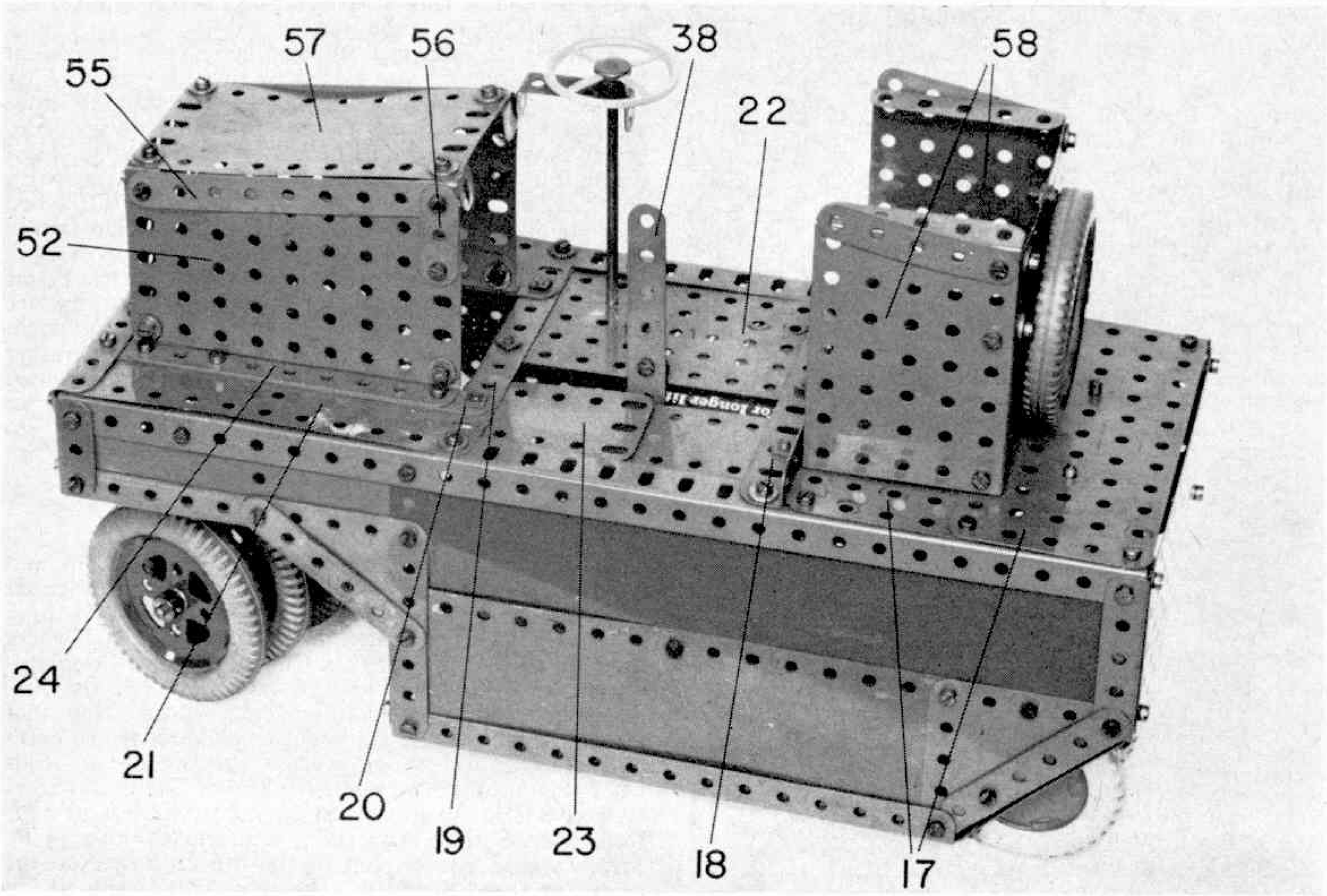
Chain is used to connect the $1\frac{1}{2}$ in. Sprocket incorporated in the rear roller to a $\frac{3}{4}$ in. Sprocket Wheel on the output shaft of a Power Drive Unit bolted to the underside of forward Plate 17. The motor switch of the Unit projects through the elongated hole of a Fishplate 33, fixed by Nuts on the shank of a $\frac{3}{4}$ in. Bolt secured in the fifth hole of a $5\frac{1}{2}$ in. Strip 34. This Strip is free to move in two Slide Pieces 35 attached by $\frac{1}{2}$ in. Bolts to the left-hand side of the body, but spaced from it by a Collar on the shank of each securing Bolt. A Rod Socket, carrying a 2 in. Rod, is fixed to the forward end of the Strip, while a Short Coupling 36 is fixed to the upper end of the 2 in. Rod. Another 2 in. Rod 37, at right-angles to the first, is secured in the longitudinal bore of the Short Coupling, its other end being inserted in the end hole of a $3\frac{1}{2}$ in. Strip 38 lock-nutted to an Angle Bracket bolted to the side of Flat Plate 22. Movement of Strip 38 should control the stop/start/reverse actions of the Power Drive Unit which, incidentally, is set on the 32 : 1 ratio.

If a self-contained power source for the Power Drive Unit is to be incorporated, then now is the best time to fit it. In the model illustrated we used an Ever Ready PP1 battery positioned beneath Flat Plate 22 and held in place by a 3 in. Strip 39 fixed by Nuts on two 3 in. Screwed Rods secured to the Flat Plate.

Superstructure

Next we come to what I have rather loosely termed the superstructure, but which, on the full-sized machine is made up of the cab and engine, etc. (Only the "engine cover" is of course present on the model.) Each side of the cab consists of three $6\frac{1}{2}$ in. compound strips 40 obtained from $5\frac{1}{2}$ in. Strips extended by $2\frac{1}{2}$ in. Strips and bolted to compound girder 1, the foremost strip being angled forward slightly. At the top, the strips are connected by a $5\frac{1}{2}$ in. Angle Girder 41, Girders 41 at each side themselves being connected by a $5\frac{1}{2}$ in. Angle Girder 42 as well as by one $5\frac{1}{2} \times 1\frac{1}{2}$ in. and two $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plates, forming the roof. Attached by Angle Brackets to rearmost strips 40 is a $5\frac{1}{2} \times 3\frac{1}{2}$ in. Flat Plate 43 extended up to the roof by a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Transparent Plastic Plate.

Bolted to the foremost strip 40 at each side is a $1\frac{1}{2} \times 1\frac{1}{2}$ in. Flat Plate 44, to which a second similar Plate is attached by a $1\frac{1}{2}$ in. Angle Girder. Attached,



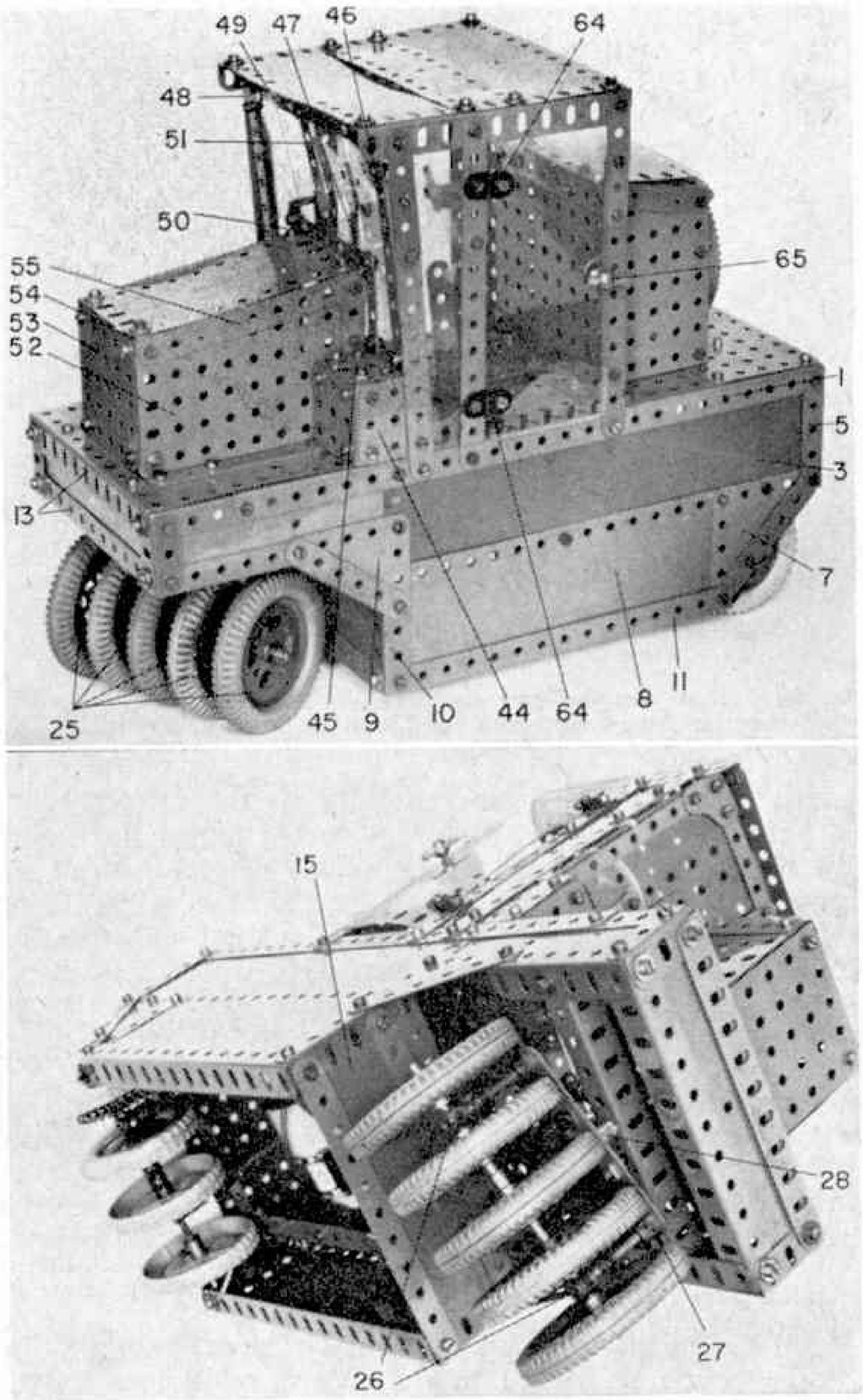
in turn, to this Plate by Angle Brackets is a $1\frac{1}{2}$ in. Flat Girder 45, Angle Brackets also being used to fix a $4\frac{1}{2}$ in. Narrow Strip 46 and a $2\frac{1}{2}$ in. Narrow Strip 47 to the Flat Girder, the securing Bolts helping to hold a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Transparent Plastic Plate in place. A 1 in. Corner Bracket 48 is bolted to each Narrow Strip 46, these Corner Brackets then being connected by a $5\frac{1}{2}$ in. Narrow Strip 49. A $3\frac{1}{2}$ in. Narrow Strip 50, on the other hand, is used to connect Narrow Strips 47 at each side, the right-hand securing Bolt also holding in place inside the cab a $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip held by one lug. Journalled in this Double Angle Strip and in Flat Plate 22 is a $4\frac{1}{2}$ in. Rod, serving as the steering column, held in place by a $1\frac{3}{4}$ in. Steering Wheel above the Double Angle Strip and by a $\frac{3}{4}$ in. Sprocket Wheel beneath the Plate. As mentioned earlier, this Sprocket is connected by Chain to Sprocket Wheel 29.

A 3 in. Narrow Strip 51 is then bolted between the centres of Narrow Strips 50 and 49, the upper securing Bolt holding a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Transparent Plastic Plate in position to complete the windscreen.

Now bolted to the vertical flange of each Girder 24 is a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 52, the front Bolt fixing the Plate to the Girder also holding an Angle Bracket in place. Secured to this Angle Bracket is a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 53, the upper corners of which are also attached to Plates 52 by Angle Brackets. The Bolt fixing each Plate 52 to these last Angle Brackets also fixes in position yet another Angle Bracket 54 and a $4\frac{1}{2}$ in. Strip 55 angled upwards slightly and bolted, along with a further Angle Bracket, to the end of a $1\frac{1}{2}$ in. Strip 56 projecting one hole above the rear corner of Plate 52. Bolted to this further Angle Bracket and Angle Bracket 54 is a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 57 serving as the top of the engine cover.

Secured to Flat Plates 17 immediately behind the cab are two $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plates 58 joined by another similar Flanged Plate 59. This Flanged Plate is extended upwards by a $3\frac{1}{2} \times 1\frac{1}{2}$ in. compound flexible plate 60 obtained from two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates and attached to Flanged Plates 58 by Angle Brackets, each side securing Bolt also holding a $2\frac{1}{2}$ in. Strip 61 in place. A spare front roller wheel 62 is bolted to the front of Plate 59, then a top for the whole construction is supplied by a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 63 fixed to the upper edge of Flat Plate 43 by Angle Brackets bent to a slight acute angle to allow the Flexible Plate to follow the "slope" formed by Strips 61.

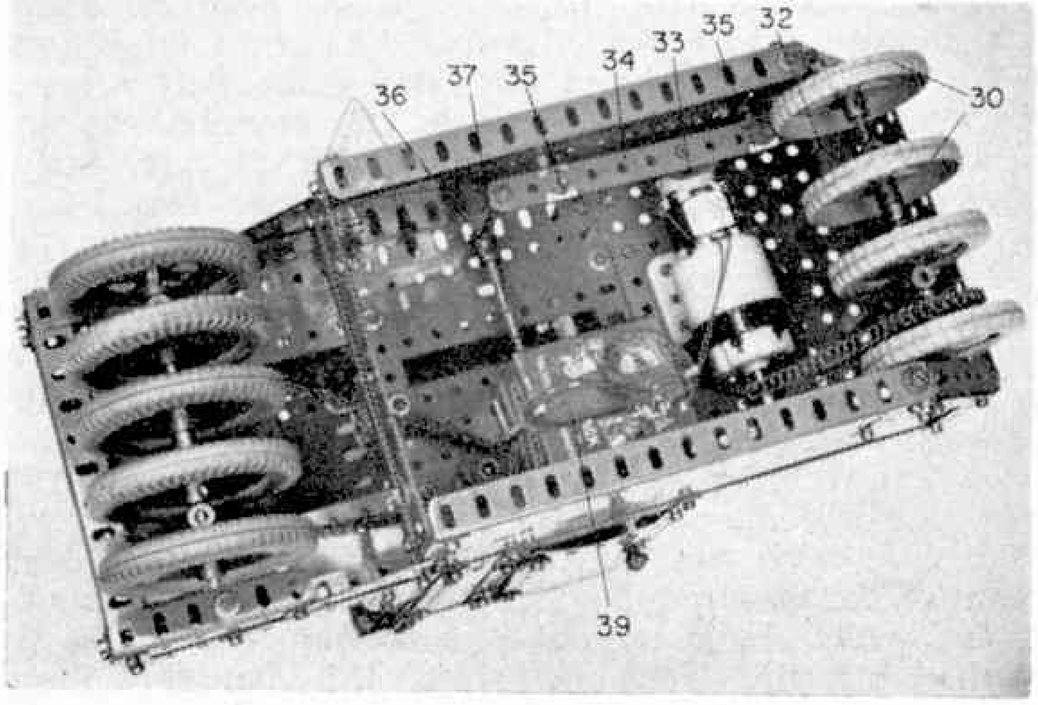
Last of all, two opening doors are fitted to the cab,



Three-quarter front view of the model, shows clearly the construction of the front end.
Lower photo: Construction of the front "roller" and wheel-arch are clearly shown in this close-up view of the model.

each door consisting of nothing more than a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Transparent Plastic Plate secured to centre compound strip 40 by Hinges 64. A door handle is supplied by a 1 in. Rod fixed in the head of a Handrail Support 65 attached to the edge of the door. Held by Nuts on the shank of the Handrail Support is a Fishplate which engages behind rear strip 40 to secure the door.

Another underside view of the Road Roller clearly showing the model's drive system. Note the built-in battery, making the model independent of an outside power source.



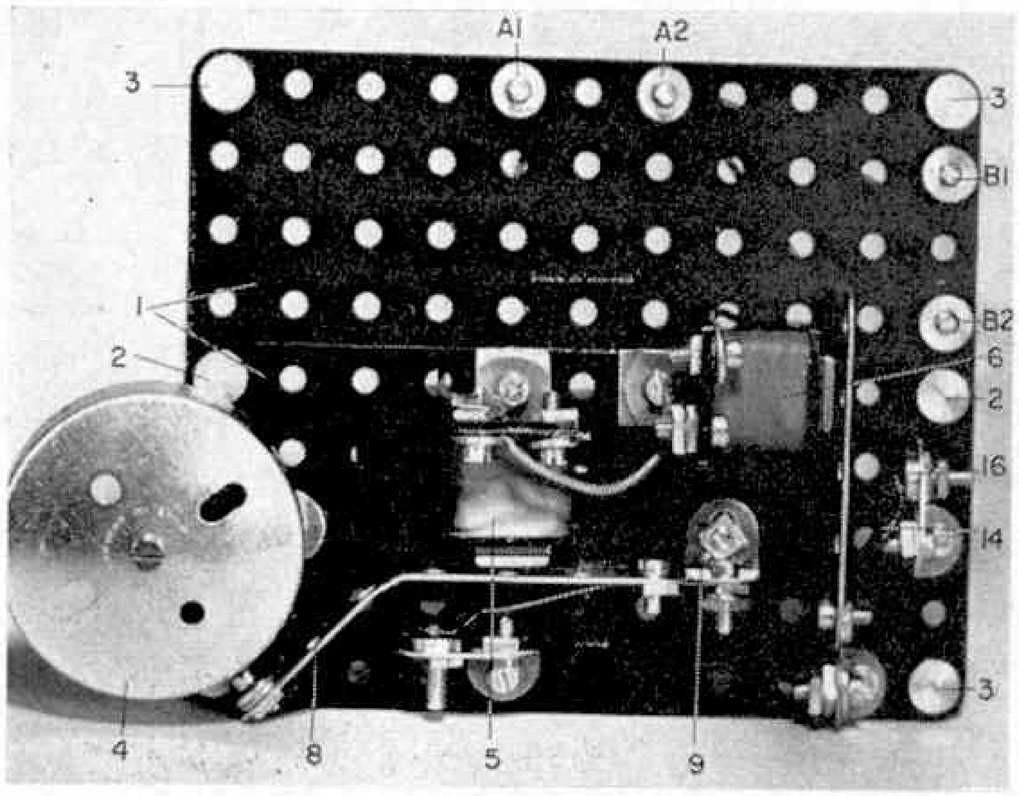
PARTS REQUIRED

10—2	2—15b	4—74	1—191
2—2a	1—16	2—80c	2—192
3—3	2—17	1—94	1—193b
8—4	2—18a	1—95a	1—193d
8—5	2—18b	1—95b	3—193e
2—6a	6—20a	2—96a	2—195
2—8	208—37a	2—103f	2—196
2—8b	194—37b	1—111	2—222
6—9	54—38	2—111a	2—223
2—9a	1—48	4—114	2—235
2—9c	2—50	2—133a	1—235a
4—9d	3—53	2—136	1—235b
2—9e	3—53a	6—142a	2—235d
4—9f	13—59	3—179	1—235e
3—10	1—62b	1—185	1—235f
25—12	4—63	4—187	1—Power Drive Unit
4—12c	1—63d	4—188	1—6 v. Battery
1—15	3—70	6—189	
1—15a	1—72	1—190a	

AMONG THE MODEL BUILDERS

with

Spanner



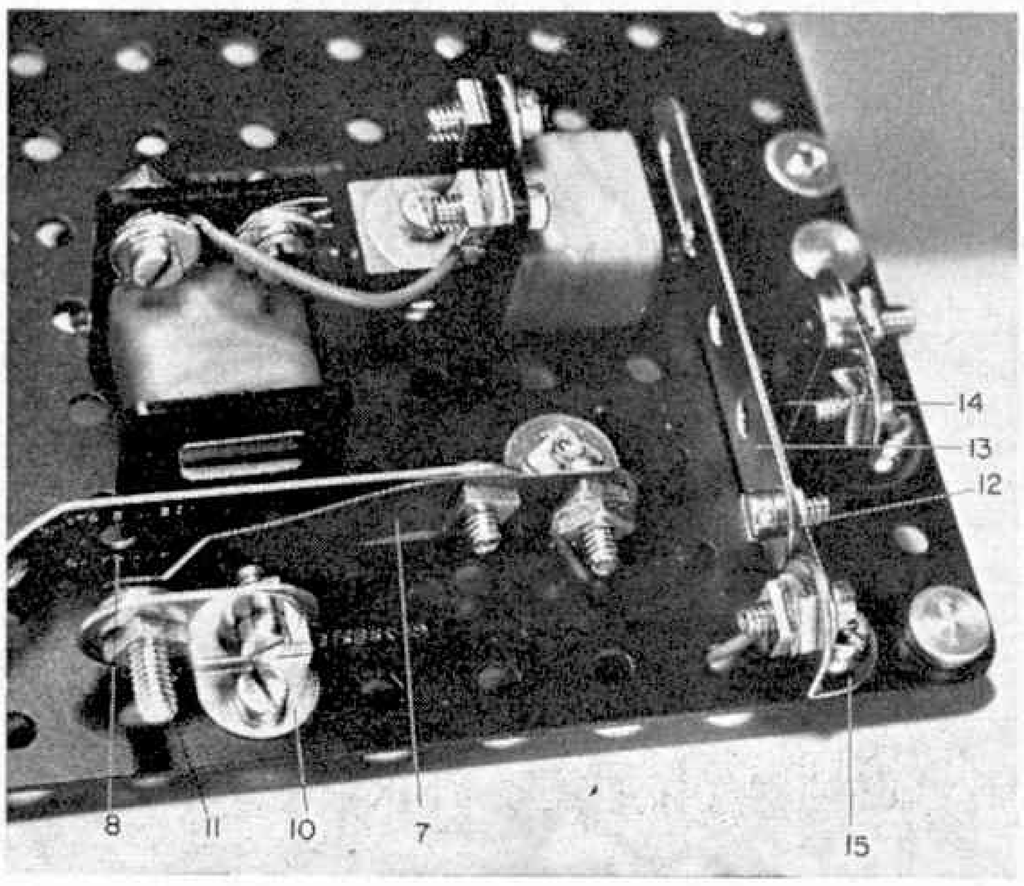
An item that can be put to very good practical use is this Burglar Alarm designed by Timothy Ward of Bristol.

PERHAPS THE most generally useful introduction to the Meccano system in recent years has been the range of electrical parts which first appeared in 1963 contained in the Elektrikit. These parts have increased the scope of the basic system enormously and, in fact, many of them have frequently been used in models described in the M.M. since 1963. In almost every case, however, only a selection of parts have been used to electrify a standard-built model. We have hardly ever featured a complete electrical model or, at least, a piece of electrical equipment built up mainly from Elektrikit parts. This state of affairs is unfortunate, but is one that we can now rectify slightly with the first contributed item described below.

Burglar Alarm

This comes from an extremely busy designer in Gloucestershire, Mr. Timothy Ward of Bristol. Mr. Ward often sends me details of equipment and models he has produced, but I was particularly impressed by the Burglar Alarm shown in the accompanying photographs. The baseplate consists of two $5\frac{1}{2} \times 2\frac{1}{2}$ in. Insulating Flat Plates 1, overlapped one hole and fixed together by Contact Studs 2. Four additional Contact Studs 3 are secured one in each corner hole of the resulting compound plate, a Washer being added to the two Studs in the lower Plate to result in the protruding shanks of all the Studs being equal in length. These protruding shanks act as legs for the baseplate.

A close-up view of the solenoid switch and bell magnet incorporated in the Burglar Alarm.



Bolted to the upper Insulating Plate is a $1\frac{1}{2}$ in. Strip, to the end of which an Elektrikit Bell 4 is fixed, the Bell being mounted on a $1\frac{1}{8}$ in. Bolt held by Nuts in the Strip. Two Rectangular Coils 5 and 6 are then each secured by Core Holders to a Rectangular Core which is fixed to the baseplate, in the position shown, by a $\frac{3}{4}$ in. Bolt, four Washers on the shank of this Bolt spacing the Core from the baseplate. A striker for the Bell is produced from a $2\frac{1}{2}$ in. Wiper Arm 7, extended by a suitably bent $3\frac{1}{2}$ in. Strip 8, in the end hole of which a Bolt carrying two Washers is held by a Nut. The striker is secured to the baseplate by an Angle Bracket 9.

A contact for Wiper Arm 7 is next built up from an Angle Bracket 10, fixed by a $\frac{3}{8}$ in. Bolt to the baseplate. One lug of this Bracket is extended by a Fishplate, in the elongated hole of which a Contact Stud 11 is held. Wiper Arm 7 should now be bent and the striker positioned so that, with no current applied, the Wiper should make contact with Contact Stud 11, the striker should be away from the Bell and Strip 8 should lie about one or two Strip thicknesses away from the Core of Coil 5. If Strip 8 is moved towards the Core, however, the Wiper should break contact with Stud 11 a fraction before the striker hits the Bell.

In the case of Coil 6, a vibrator is produced from a 2 in. Flexible Strip 12, extended by a $2\frac{1}{2}$ in. Strip 13, the connecting Bolt also fixing a bent 1 in. Wiper Arm 14 in place. As in the case of the Bell striker, Flexible Strip 12 is attached to the baseplate by an Angle Bracket 15. With the vibrator at rest, Strip 13 should lie, as before, about one or two Strip thicknesses from the Coil's Core, while Wiper 14 should connect with a Contact Stud 16 fixed in the elongated hole of a Fishplate which is, in turn, fixed to the baseplate by an Angle Bracket. If Strip 13 is moved towards the Core, Wiper 14 should break contact with Stud 16.

Before coming to the wiring, four terminals A1, A2, B1 and B2 are added to the baseplate. In the unit illustrated, the A terminals were produced from $\frac{3}{8}$ in. Bolts secured by Nuts and carrying Terminal Nuts, while the B terminals made use of $\frac{1}{2}$ in. Bolts with Nuts and Terminal Nuts. Any suitably long

Bolts would do, however, and, as a matter of interest, it is advisable to use longer-than-ordinary Bolts at all points where wiring is to be connected.

The wiring itself should present no problem and can be made to look very neat if as much as possible is run beneath the baseplate. Terminal A1 is connected to the S Terminal of Coil 5, this latter terminal also being connected to the S terminal of Coil 6. The E terminal of Coil 5 is connected to the $\frac{3}{8}$ in. Bolt fixing Angle Bracket 10 to the baseplate, while the Bolt fixing Wiper Arm 7 to Angle Bracket 9 is connected to the Bolt fixing Flexible Strip 12 to Angle Bracket 15. Contact Stud 16 is connected to terminal A2, this terminal also being connected to terminal B1. Terminal B2 is connected to the E terminal of Coil 6.

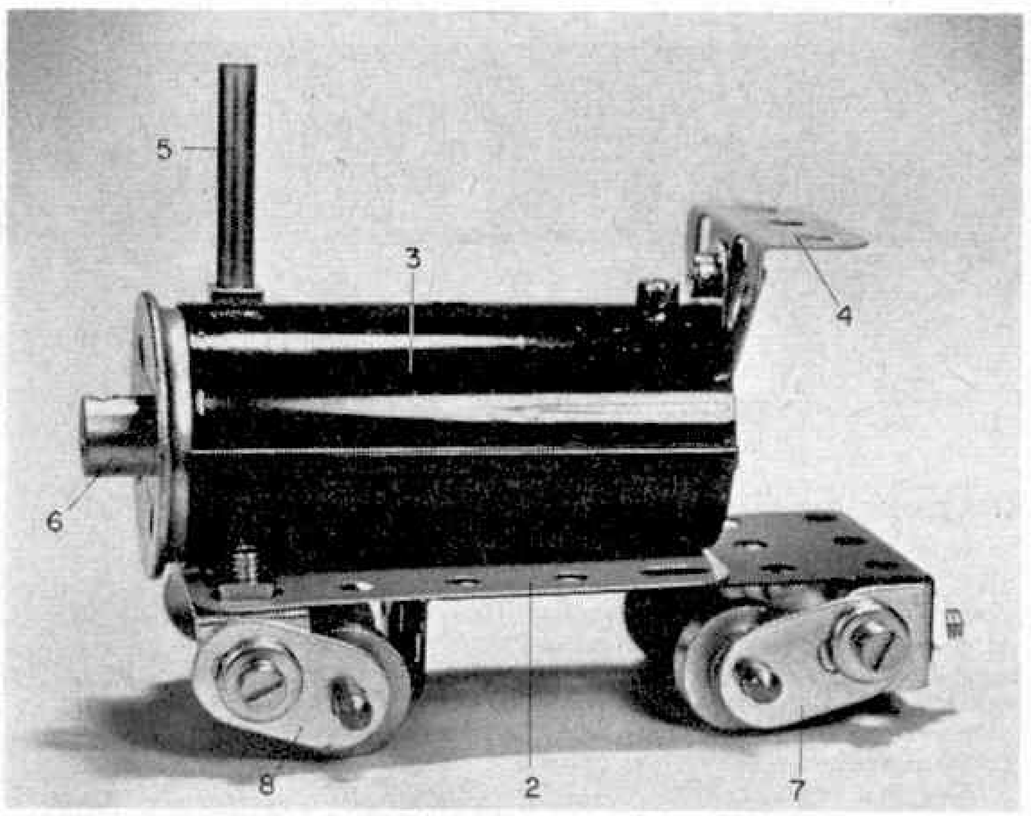
In this model, anything between 3 and 15 volts A.C. or D.C. can be used for powering purposes. The leads from the power source are connected to the A terminals, whereas the actual alarm circuit wires are connected to the B terminals. Under normal circumstances, with power connected, an unbroken circuit should exist between terminals B1 and B2, allowing current to flow through Coil 6. This Coil, with its Core, acts as an electromagnet to attract Strip 13, thus keeping Wiper Arm 14 away from Contact Stud 16. As soon as the alarm circuit is broken, however, the electromagnet is switched off and Strip 13 released, bringing the Wiper into contact with Stud 16. This completes the bell circuit and the bell rings until the alarm circuit is closed again, or the current switched off. Besides being interesting, the unit is extremely useful!

PARTS REQUIRED

1—3	10—37b	2—510	1—531
1—5	12—38	2—520	1—533
1—6a	2—111	4—525	4—542
2—10	2—111a	2—526	8—544
4—12	9—111c	1—530	1—562
40—37a	1—111d		

Miniature Locomotive

I would like to finish this month with a "quickie", also supplied by Mr. Ward, who writes, "Having seen the two miniature models in the January 1968 M.M., I thought that readers might be interested in a 4 in. long Steam Locomotive I have designed. It is very simple to build, requiring only 20 parts excluding Nuts, Bolts and Washers." Simple, it most certainly is and, as I found it interesting, I include it here in the hope that you, too, will do the same.



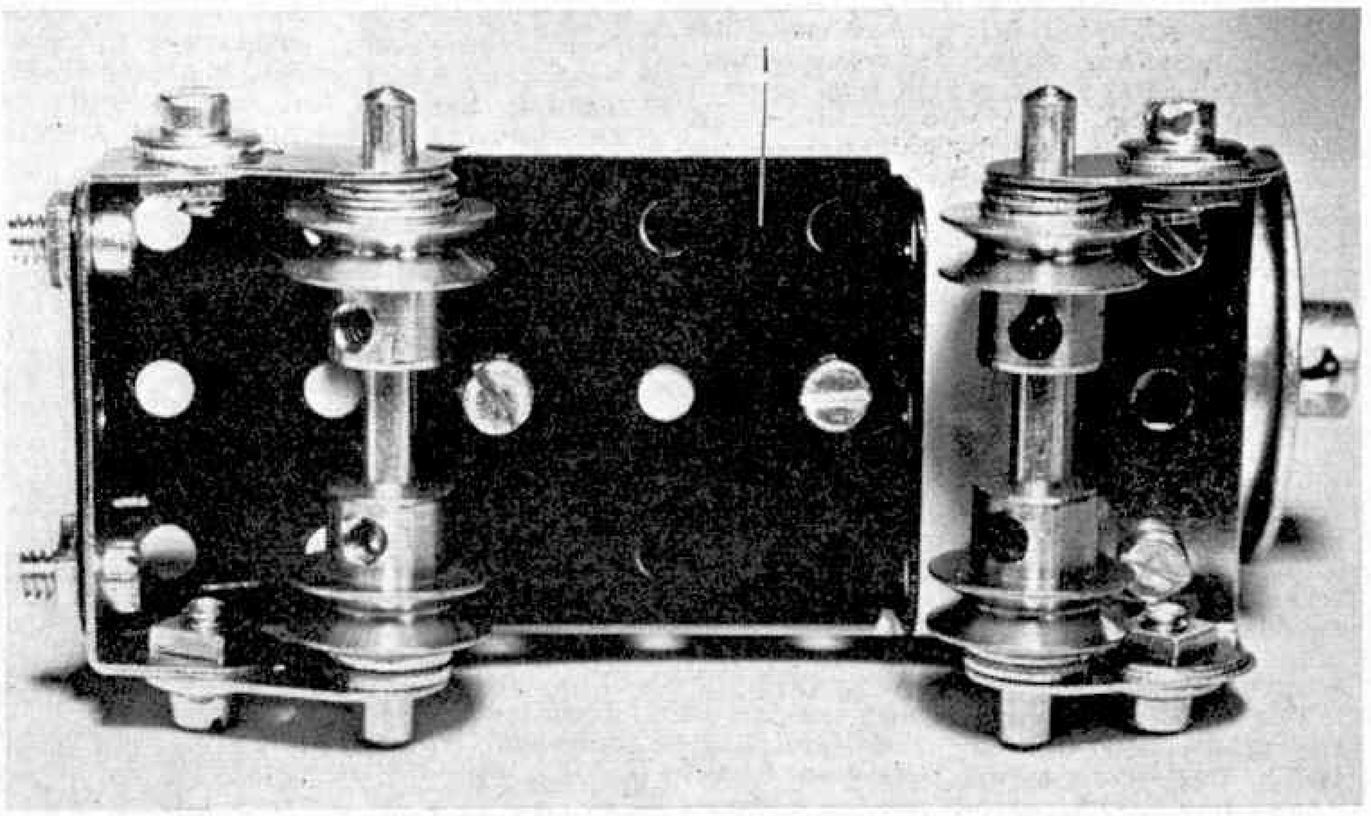
It consists quite simply of a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate 1, to which a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 2 is bolted, the securing Bolts also fixing a Cylinder 3 in place to represent the boiler. Attached by an Angle Bracket to one end of the Cylinder is a Trunnion 4 to act as the cab, while the chimney is nothing more than a Rod Connector 5 wedged on a $\frac{3}{4}$ in. Bolt held by a Nut in the top of the Cylinder. The front end of the Cylinder is enclosed by a $1\frac{1}{8}$ in. Flanged Wheel 6.

All four wheels are supplied by $\frac{1}{2}$ in. Pulleys, those at the rear being mounted on a 2 in. Rod journalled in Fishplates 7 which are bolted to the lugs of a $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip. This Double Angle Strip is in turn bolted to the inside of the rear flange of Flanged Plate 1. The front wheels are also mounted on a 2 in. Rod journalled in Fishplates 8 bolted to the lugs of a $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip, only this Strip is bolted to the underside of Cylinder 3. Note that each wheel is spaced from its respective Fishplate by two Washers.

PARTS REQUIRED

4—10	4—23a	2—48	1—188
1—12	12—37a	1—51	1—213
2—17	11—37b	1—111	1—216
1—20	8—38	1—126	

Above right: Another of Mr. Ward's ideas is this "simplicity" Steam Locomotive which uses only 20 parts excluding Nuts and Bolts.



Right: An underside view of the little locomotive showing the simple chassis and wheel-mountings incorporated in the model.

HAVE YOU SEEN ??

Monogram's Dornier DO 17Z

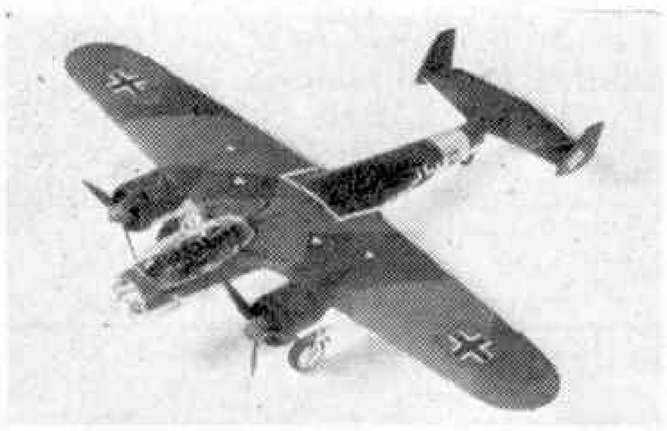
The Dornier DO 17 designed originally as a high speed mail plane, became operational as a bomber in the Luftwaffe in 1937. The Z version appeared during the latter half of 1938, and squadrons equipped with these aircraft played an important role in the invasion of Poland, France and the low countries.

The Monogram model of the DO 17Z is a mass of detail. The cockpit interior is complete with control column, instrument panel and four crewmen figures. An array of machine guns and well detailed undercarriage makes for authenticity. The landing gear can be assembled in the flight or landed positions.

The kit fitted together well, apart from the cockpit canopy and the nose window which needed a lot of fiddling about to get it to fit into position. But otherwise the model is of the usual high standard of Monogram kits.

Corgi's "Yellow Submarine"

The Yellow Submarine, piloted across the sea to Peppar Land by the Beatles, has become the subject of Corgi's latest introduction to their range of vehicles starring in films and on television. The famous four themselves are featured



in this colourful toy, and can be found popping up through the hatches at the touch of a couple of buttons. The submarine is of course finished in bright yellow, with brightly coloured port holes and insignia. When it is pushed along the wheels produce a soft purring noise, which sounds very much like a real submarine slipping through the water. At the same time, the four periscopes protruding very unorderly out of the conning tower revolve, being driven by the wheels.

Because of the Beatles immense popularity this remarkable toy is sure to become equally as popular, and at only 14s. 11d. it can't fail to miss.

Airfix Handley Page Bomber

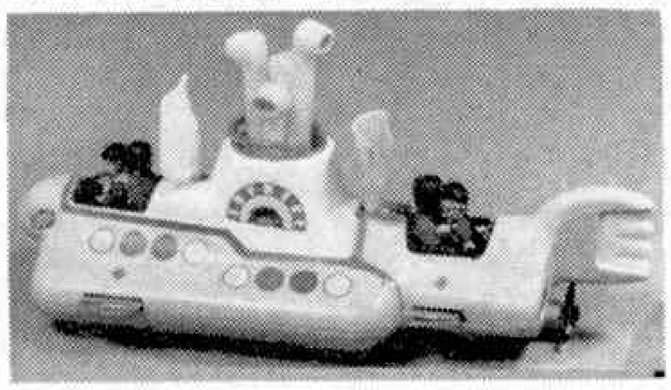
One of the new aircraft kits from Airfix is Britain's biggest bomber in the First World War, the Handley Page 0/400. Its development began in 1914 when the Admiralty ordered four large twin engined biplanes able to carry an effective load of bombs. The result was the 0/100 which first flew in 1915.

The 0/400 was an improved version of the 0/100, and this entered service in 1917. She was powered by two Rolls-Royce Eagle VIII engines, giving a maximum speed of 97 m.p.h.

The Airfix kit containing 167 parts makes up into a very realistic looking model. Its armament consists of sixteen 112 lb. bombs, or alternatively a 1,650 lb. bomb which was used in the latter months of the 1914-18 war, and three Lewis machine-guns. The kit costs 9s. 11d., and is complete with assembly and painting instructions, and a choice of decals.

The Observer's Book of Aircraft Published by Frederick Warne & Co. Ltd. Price 7s.

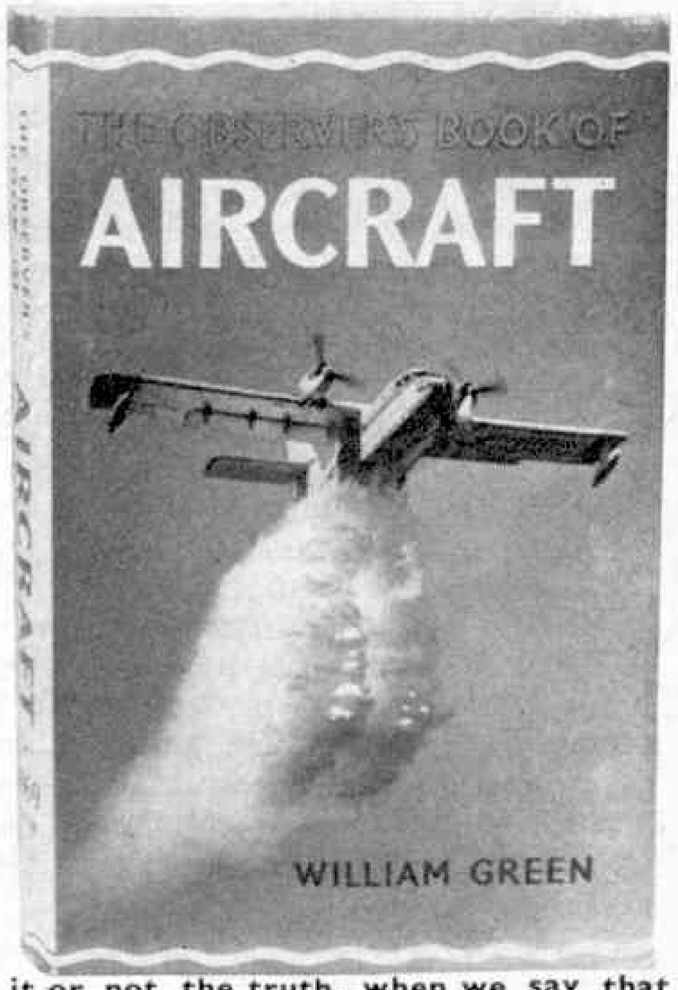
The 1969 edition of the Observer's Book of Aircraft is, as with previous editions, packed with interesting and



factual information. The aircraft described range from the little Beagle Pup, right up to the massive Antonov AN-22, and cover both military and civil. The book, measuring $3\frac{3}{4}$" x $5\frac{3}{4}$" describes no less than 153 aircraft. Each subject is accompanied by a black and white photograph, and three silhouette views—front, underneath and side. The information given is detailed. but still very easy to read and understand. We therefore advise owners of other editions not to miss this one, and so bring their collection right up to date. The price? A mere 7s., and excellent value.

Monogram Hawker Typhoon

The phrase, "Moulded to the usual high standard we have learnt to expect from Monogram," appears with regular monotony when we find that yet another kit has arrived for review from this enterprising American firm. It is, believe



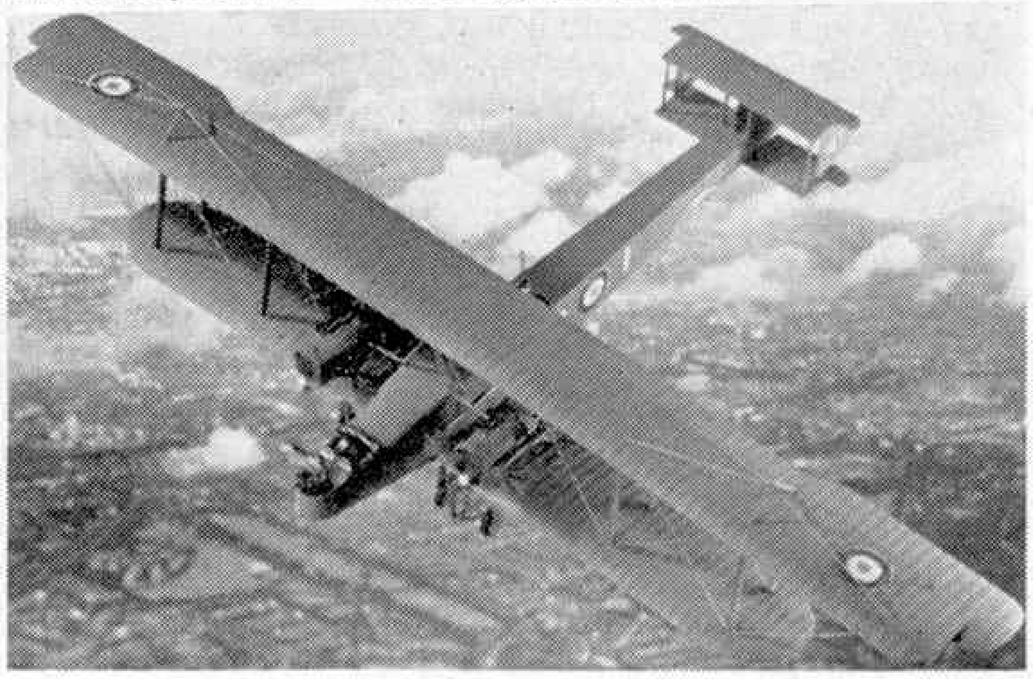
it or not, the truth, when we say that without exception, Monogram Kits are exceedingly good, and, of course, this must apply to the Hawker Typhoon.

The kit, in 1/48th scale, contains somewhere in the region of 40 parts and naturally contains the necessary transfers, or "decals" to complete it. The instructions are well illustrated making construction simple enough for even a beginner to follow. The only criticism our builder could make was in respect of the R.A.F. roundels. The central

red portion wasn't in the centre. if you can understand what we mean! This rather spoilt the overall effect. It is, of course, possible that we received a badly printed sheet.

Monogram have a nice way of making a 40 part kit look, on completion as though it were made from twice that number of bits, the Typhoon is no exception.

To sum up a well produced kit building up into a very attractive model, although rather expensive at 23s.



Above left: Monogram's DO 17Z showing off its fine array of detailed transfers. Above: Corgi's amazing Yellow Submarine, complete with the Beatles. Top right: The Observer's Book of Aircraft. Above right: The Hawker Typhoon, another of Monogram's fine aircraft kits. Right: The rather unusual Handley Page bomber by Airfix.

DINKY TOY NEWS

BY CHRIS JELLEY

Introducing.... SPEEDWHEELS

Revolutionary new feature " Supercharges " latest Dinky

ONE COMMENT that can never be applied to Dinky Toys, these days, is " The same old thing ". Definitely not! You simply never know what's going to happen next; what new feature will be fitted to the latest model to roll off the production lines at Binns Road.

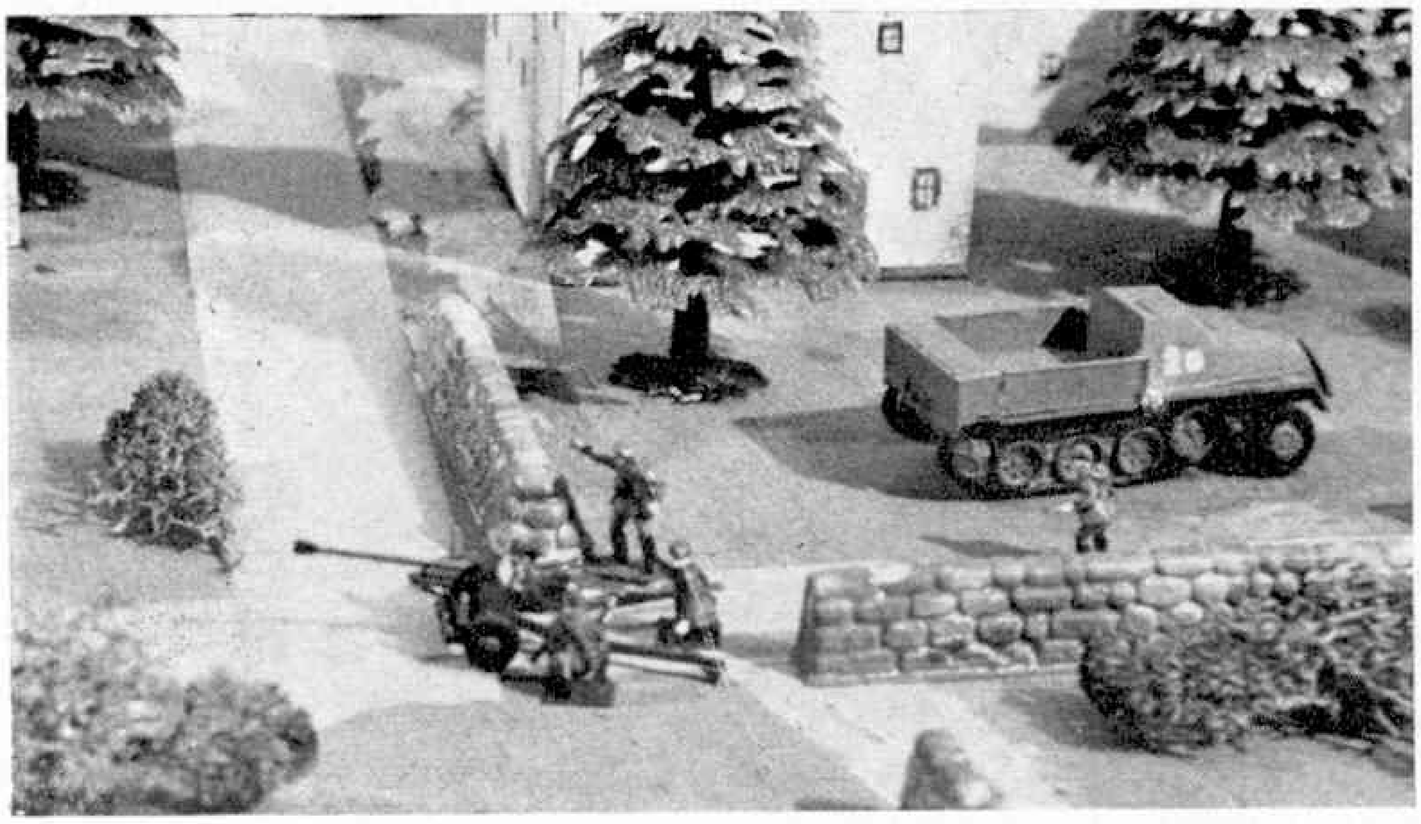
It's probably an exaggeration, but it certainly *seems* as if every new Dinky Toy introduced in the past few years has boasted something new in the way of action features or of minutely-engineered " extras " or even of both. It makes you wonder, or, at least, it makes *me* wonder, if there is anything left to invent for die-cast toys so small as Dinkys. Every time I meet the backroom boys at Meccano, now, I fully expect them to admit that at last they are beaten—that their ideas are exhausted. Every time (I am delighted to say) they prove me wrong. Not only are their ideas *not* exhausted, in fact, they do not even appear to be tiring. Some of the most recent innovations are as useful as the early features, when there was so much scope for improvement, and the very latest innovation—Speedwheels—is in some ways the best thing that ever happened to Dinky Toys!

What, you will be asking, are Speedwheels? Well, in a nutshell, they are free-rolling wheels, incorporating a special low-friction bearing, which, when mounted on new-style axles, run more smoothly, more quietly and very much longer than anything previously fitted to a Dinky Toy. A model fitted with Speedwheels will travel a lot faster and infinitely further than any " ordinary " model and it will run so comparatively quietly that it will almost seem to glide along! The axles, themselves, are produced from thin, but very strong steel wire sufficiently " springy " to serve the same purpose as all-round independent suspension, in most cases. Speedwheels, therefore, besides giving speed and distance to a model, also gives automatically, an effective suspension system to most models to which they might be fitted.

And this brings us to the first ever Dinky to include Speedwheels—No. 173 Pontiac Parisienne. This was the model scheduled for production when Speedwheels were introduced and luckily the schedule just allowed sufficient time for original specifications to be altered so that Speedwheels could be included. Thus, the Parisienne gained its place in Dinky Toy history.

While the Parisienne's major claim to fame is its Speedwheels, it is not its only claim. The model also incorporates another feature entirely new, not only to Dinky Toys, but to all similar die-cast miniatures—retractable twin radio aerials. Mounted in the rear wings, these novel items are not simply pulled out when they are to be extended, but are raised by the much more sophisticated method of two small control buttons sliding in slots in the rear underside of the baseplate. Push the buttons forward and the aerials rise up out of the body; push the buttons rearwards and the aerials retract.

In real life, the Pontiac Parisienne is a typically big North American car, therefore the Dinky, being made to 42nd scale, is a big—and I might add, solid—model with an overall length of $6\frac{1}{16}$ in., a width of $1\frac{15}{16}$ in. and a ground height of $1\frac{5}{16}$ in. It is fitted with windows, seats, steering wheel and American-style number plates, the actual windscreen moulding incorporating rear-view mirror and windscreen wiper representations. The colour-scheme of the model I have before me, while possibly *sounding* a little bilious, is really very striking indeed being a deep " polished " red body with contrasting yellow seats and silver base, radiator-grille and bumpers. Even without Speedwheels it would be a model to add to your collection and, in fact, by the time you read this, you might already be the owner of at least one example. If so, you will have tried and, I am sure, been impressed by its Speedwheels, so I will close with the assurance that there are plenty of other Speedwheels models to come. Keep in touch with your local dealer for up-to-the-minute information.



BATTLE

by Charles Grant

PART XV

INFANTRY ORGANISATION

BEFORE THROWING our infantry into the heat of action it might be a good thing to devote a little time to a consideration of just how they should be organised to carry out their proper role on active service. This is a question, obviously, in which the wargamer can make his own decisions, although, if he should be really historically as well as militarily minded, and has opted for an army of some particular nation or other, then it would be logical for his wargame troops to adhere to the system prevailing in his adopted country's forces. If, for instance, he has chosen to field an American army—and more especially, a force of U.S. Marines (the Airfix box is a considerable temptation to do so)—then he will have to do some reading up about the organisation of that very famous outfit. On the other hand, if his army is a totally or even partially fictitious one, he must still know a little about the basic essentials of military organisation to ensure the maximum effectiveness of his troops. Naturally, this is not to say that the wargamer cannot do what he likes with this army, and if he thinks it a good thing—just to hazard one possibility—to have his infantry units armed with sub-machine-guns only, then that's entirely up to him, although when he does commit such a force to battle he is liable to receive a sudden and grievous shock if he comes up against infantry with the proper quota of weapons and with, among other things, a due proportion of riflemen. It will very quickly cause a big rethink and a quick dash to the nearest and most convenient book dealing with the various weapons used by the infantry arm.

I don't intend to fatigue the reader with a long list of books on the subject, or to enumerate a lot of highly technical treatises, believing that, as I have said before, it is much better to give one readable and generally accurate source. From this, if desired, the enthusiast can go on to, if not necessarily better, at least more detailed references or can remain content with the one given, as he pleases. As far as present needs are concerned, I cannot do better than suggest a most informative book by an American authority—Jac (this *is* the correct spelling) Weller, this being "Weapons and Tactics", and it is from this work that the following details are culled—adding the remark that the volume is excellent reading and worth any amount of perusal.

In view of the fact that the next part of "Battle" will be the account of an actual infantry action on the wargame table, what we are going to do now is to assemble sufficient data on the organisation of the units appropriate for such an action—it will be a small scale one—and to see how we can reproduce them in miniature within the limitations of the model soldiers we use. What we may well end up with might be a pretty polyglot sort of thing—wargamers being notoriously of an individualistic and experimental turn of mind—and indeed it might not be a bad thing to take the best of all possible systems and decide upon a setup which we think would give a good account of itself, even though it might not be strictly in keeping with any particular national army. As long as it has some sort of military validity and is not too far out of this world, we need not be over-concerned.

If would be best, then, if we started on the ground floor as it were, for after all it is on the smallest scale that we shall be operating at the outset, and what better to begin with than the basic British infantry unit (not forgetting that throughout we refer to the last year or two of World War II—present day organisation might well be different, not only as regards Britain but also with other countries with which we might be concerned). This is, in fact, the rifle section, three of which, plus a headquarters section, made up a platoon, there being three platoons to the company, which also had its company headquarters. The principal arm of this section—ten men in all—was naturally the rifle, this being carried by eight men, while the section leader had a sub-machine-gun and there was also the light machine gun, the Bren. While the platoon HQ was equipped with a 2 in. mortar, the company HQ was provided with heavier stuff, three of the short range but very effective rocket launchers, the PIAT. All this made up, if my arithmetic is correct, a fighting company of 125 men, armed with 9 LMG's, 9 SMG's, 3 mortars and 3 rocket launchers, plus rifles. So far so good—this gives an idea of what the proportions of the various infantry weapons should be, the basic rifle sections having stronger support at either platoon or company level.

Let us press on and take a look at a couple of other armies: first the German—again World War II, of course. In it we come across certain similarities to that described above, and again we have a basic unit consisting of riflemen plus a light machine gun. The guiding principle, apparently, was that this squad—ten men in number—could be multiplied 'x' times to provide larger units. Three rifle squads had a support squad, armed with 50 mm. mortars, the four together being reckoned as a platoon. The German company

numbered three of these plus supporting heavy weapons, all very similar, in fact, to the British system. Company headquarters had an anti-tank squad, armed with the formidable Panzerfaust, the German recoilless rifle.

Finally, let us very briefly examine the Russian system prevailing at our particular period. At ground level, we have much the same sort of idea as those already described—military thinking has no great national barriers—the rifle company consisting of four platoons, one of which was the ' weapons ' one. This gave a theoretical total of 143 men to the company, their weapons including 2 medium machine guns, eighteen light machine guns, and two infantry mortars. The remaining weapons were rifles and sub-machine-guns, the latter being more numerous than in other armies, in which they were usually officers' or N.C.O.'s weapons.

What we shall initially require is a smallish unit we can use in a simple sort of engagement to illustrate the rules governing infantry in action, and several items normally deemed necessary will be left out for the sake of simplicity. The lack of any sort of signals organisation will be noticed at once, and although the outfit we are considering might not have the benefit of such a luxury, if we are going to consider our units to be representative of something larger, they certainly would be provided with an adequate communications system. *Our* lot will, however, for present purposes be the immediate combat personnel and as such will provide only the veriest essentials of manpower, although I might point out at this stage that the actual ' company strength used is but a skeleton and will certainly be increased numerically—let alone in ancillary services—as we proceed to more elaborate warfare. With the exception of our fighting troops, we don't want to be cluttered up with too many bodies on the occasion of our first infantry encounter.

The organisation I propose to use, therefore, has basic similarities to those I briefly discussed already, but is strictly an individual one, for which I do not claim perfection by any means. It is most positively, though, very functional and has proved to be so on many a wargame table, operating realistically, in both victory or, regrettably, in utter defeat. The setup is based on three infantry squads, numerically equal although not entirely so on weapon capability. Instead of concentrating the support weapons, they have been distributed, and a glance at the photograph will show the details. Two—Nos. 1 and 2—consist of leader (officer or N.C.O.), 4 riflemen, 2 sub-machine-gunners, and a rocket-launcher team of two men. No. 3 squad substitutes an infantry mortar for the rocket-launcher. The keen-eyed reader night notice that the troops are vaguely Russian in appearance. This is not surprising, as they emanate from the Airfix box of Russian infantry—the conversions being those already described in this series. Heavy machine guns are also absent. As we shall see later, I use these concentrated in a single group, feeling that they are basically defensive weapons, and the squads we are dealing with at the moment are, I hope, essentially assault troops. The three squads form a company, although for myself I term them a " Battle Group ", and if you had three such groups, plus the appropriate support, they might be equated to an actual battalion, as it will be found that in the wargame their capabilities are comparable to this larger unit.

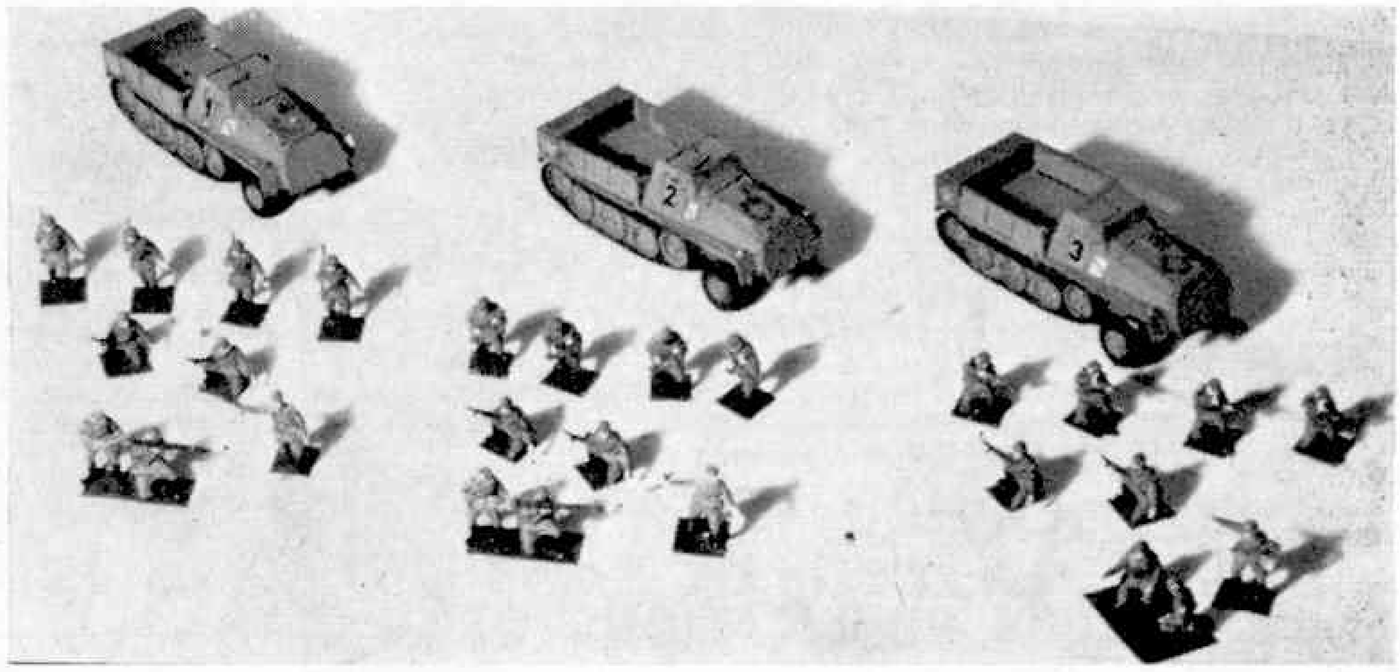
The ' Group ' transport is shown in the photograph and consists of three armoured half-tracks—quite happily and without compunction, I mingle Soviet troops and German vehicles, and later on I shall doubtless commit even more dreadful sins—one squad per vehicle. It is assumed that the driver, who is invisible anyway, is an integral part of his vehicle. One can go to town on the numbering and identification of the transport—plenty of ' serial numbers', divisional and other signs and so on all go towards making the vehicles realistic, and, as long as there is for wargame purposes and the writing of orders one identifying number, then it does not matter too much about the rest—artistic licence is tolerated, even welcomed.

One point might be mentioned concerning the actual loading and carrying of the troops. They—the men, that is—can be piled up in the back of their half-tracks and trundled about in an undignified sort of heap, which is all very well, but does not please the eye overmuch—the figures tend to get knocked about as well. It is better to have a series of small boxes—off the table and each numbered to relate it to a particular truck or whatever—into which the troops can be placed, and at the same time something put into the vehicle to show that it is full of personnel—a counter, a tiny block of wood, or even a scrap of paper. This is even more necessary when the transport, as will frequently happen, is covered trucks, into which figures simply cannot be pushed. The actual process of loading or unloading occupies one game move, the climbing in or scrambling out part thereof taking up a third of the move time. This means that, when the vehicle arrives at a particular point during one move, on the succeeding one the troops can be ' debussed ' by being placed up to 2 in. from the side of the truck, and when boarding they can be moved ' into ' it—or into the representative box—when within 2 in. of any part of it.

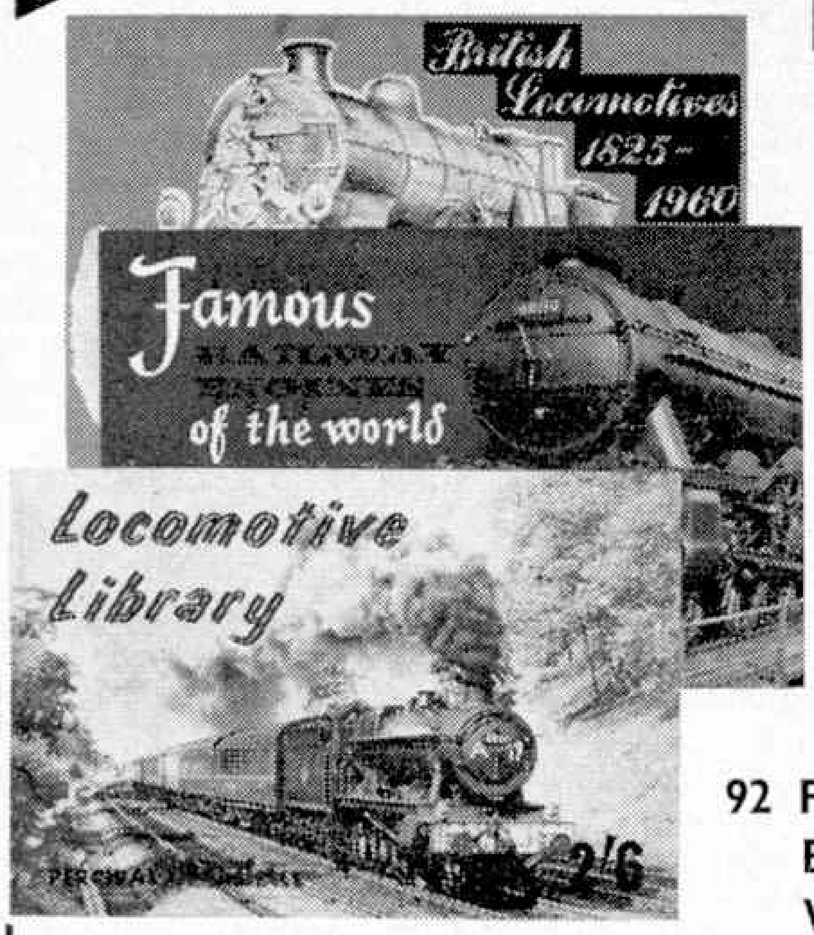
After which new rule we are ready for action once again.

Heading photograph shows Anti-tank gun in action with ' prime-mover ' in close attendance.

Right: Suggested infantry organisation referred to in the text.



MAP **The Finest Range of Model Technical Books in the World!**



BARGAIN BOOKS!

83 LOCOMOTIVE LIBRARY

Sixty locomotives illustrations. *4¼ x 7¼ in. landscape. 60 pages.* (50c) **2/6**

90 BRITISH LOCOMOTIVES 1825-1960

Paper cover. 4¾ x 7¼ in., landscape. 25 pages. (15c) **1/-**

92 FAMOUS RAILWAY ENGINES OF THE WORLD

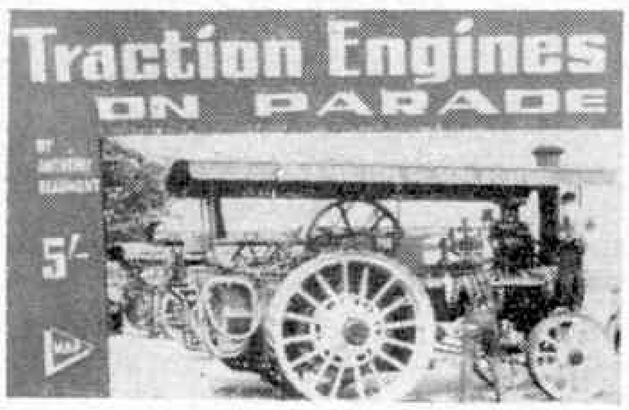
Seventeen famous railway engines described. Paper cover. *4¾ x 7¼ in. landscape. 32 pages.* (15c) **1/-**

110 SPECIAL OFFER!!

Three locomotive books, value 4/6, as above, at post free price of **3/6**

117 Solarbo Book of BALSA MODELS

About Balsa and Working with Balsa; Making a Building Board . . . Then we go on to many, many dimensioned and often full-size drawings to cover: Boxes and Cabinets, Racks . . . a Birdhouse; Solid Balsa Carved Figures; Space Frame Models; Balsa Bridges; Carved solid models—aircraft, cars, ships; Carving Propellers; Chuck and Catapult Gliders; Whip Control Models; Boomerangs; Kites, Helicopters, Helikite; Simple Ship Models, water lineship models, power models; Prop-Hydro; Round Bilge Hulls; Submarine; Kon Tiki Raft and other historic models; Catamaran; Scale Car and Roadside Models; Trackside Models (slot cars); Airport Buildings; Other Scale Buildings; Architectural Models. *10¼ x 8¼ in. 112 pages.* **15/-**



TRACTION ENGINE BOOKS...

79 TRACTION ENGINE PICTURES

Sixty traction engine pictures of all shapes and sizes. *4⅞ x 7¼ in. landscape. 64 pages. Two-colour drawn on card cover. 60 photo-illustrations.* **3/6**

78 PLOUGHING ENGINES AT WORK

A fine photo collection of ploughing engines and their ancillary equipment at work. *4⅞ x 7¼ in. landscape. 58 pages. Two-colour drawn on card cover. 58 photo-illustrations.* **5/-**

76 TRACTION ENGINES ON PARADE

A captioned selection of showman's road locomotives, tractors, traction engines and steam motor tractors, wagons, portable engines, ploughing engines and rollers. *4⅞ x 7¼ in. landscape. 58 pages. Two-colour drawn on cover. 58 photo-illustrations.* **5/-**

108 STEAM UP

A new selection of traction engine and wagon pictures. There are 50 page pictures, plus cover illustration. *4⅞ x 7¼ in. Two colour drawn-on card cover, index, introductory notes.* **5/-**

1 ALL ABOUT MODEL AIRCRAFT

A detailed book for the beginner . . . the author is world famous for his clear descriptions and in 21 comprehensive chapters with a wealth of photo illustrations, covers this wide subject.

All about rubber- or power-driven models—free flight, control line; including building instructions for a trailer, model aero engines and fuels. Completely reset 1968 and with 30 additional illustrations, revisions. Over 50,000 sold of earlier editions.

160 pages, 8½ x 5½ in., profusely illustrated throughout. Full colour hard cover. **15/-**

USEFUL BOOKLETS...

All *7¼ x 4⅞ in.* and **2/6** each.

111. MODEL RAILWAY HANDBOOK. Guide for all interested in small gauge scenic and proprietary railways. Tables, trade list, clubs. 68 pages. **115. MODEL BOATS RADIO CONTROL HANDBOOK.** Introductory booklet for r/c enthusiasts. Equipment maintenance, fault-finding r/c yachts, etc. 36 pages. **116. MODEL CARS SLOT MOTORS.** Up-to-date review (Autumn, '68) of available slot motors for electric car racing plus "hot-up" info. 64 pages.

ORDER FORM

HOW TO ORDER. Ring round the reference number of the titles you have chosen. POSTAGE free on orders over 12/6. Please add 1/- packing & postage for orders of 12/6 and below.

1 · 83 · 90 · 92 · 110

117 · 79 · 78 · 76

108 · 115 · 116 · 111

Name .....

Address .....

£

.....

MODEL & ALLIED PUBLICATIONS LTD.
13-35 Bridge St., Hemel Hempstead, Herts.

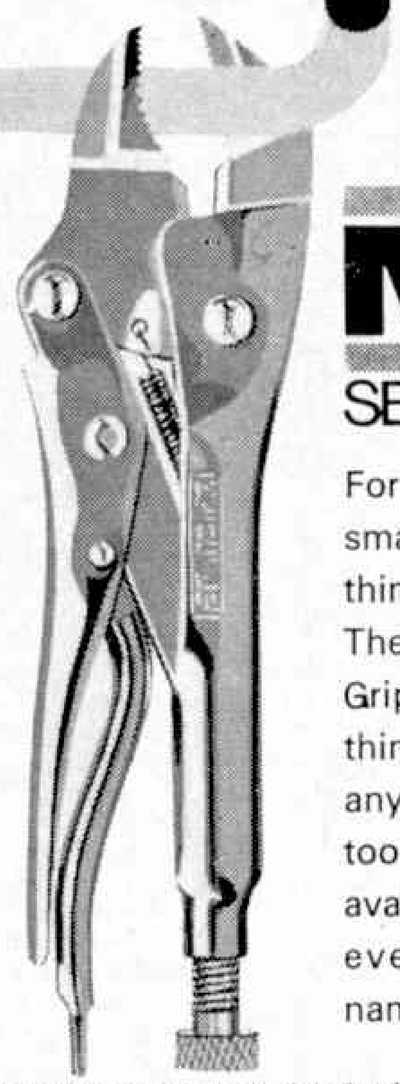
THE OBSERVER'S BOOK OF AIRCRAFT

By William Green

This book has been entirely revised and brought up to date for the 1969 edition. It contains 124 three-view silhouettes of the highest accuracy, 155 half-tone illustrations and information on the World's latest aircraft. It is recommended by numerous aeronautical organisations, and also by The Boy Scouts Association. Size is $5\frac{3}{4}''$ x $3\frac{5}{8}''$, uniform with The Observer's Book of Automobiles by L. A. Manwaring also revised for 1969. 7s net

1-4 Bedford Crt., London, W.C.2 **Warne**

now! to aid your skill

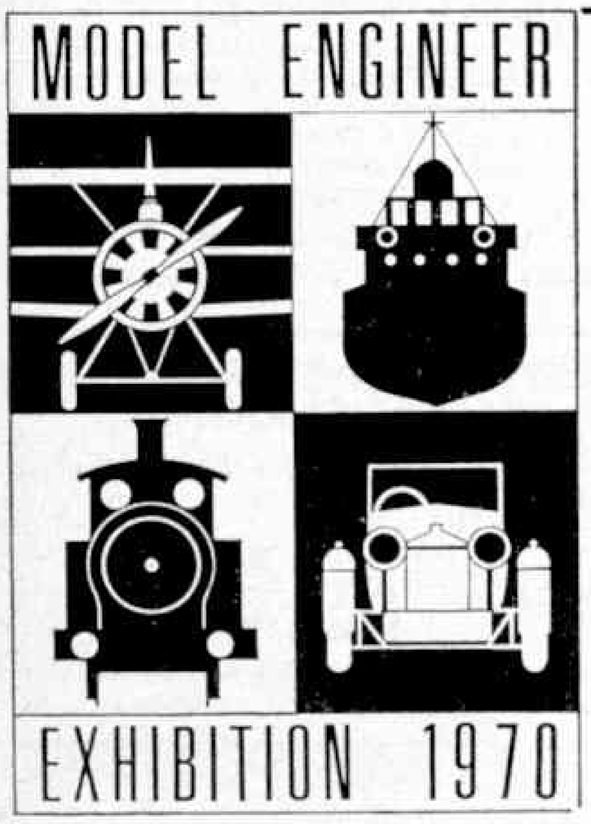


MINI MOLE SELF GRIP WRENCH

For getting to grips with the smaller job, here's the very thing!

The pocket size MOLE Self-Grip WRENCH holds everything — round, square, flat or any odd shape — and locks on too. New on the market, it is available from hardware shops everywhere—ask for it by name. **12/6**

M. Mole & Son Ltd., Crindau Works, Albany Street, Newport, Mon.



39th MODEL ENGINEER EXHIBITION

31st December, 1969—10th January, 1970

SEYMOUR HALL, LONDON, W.1

AWARDS

The cups, medals and diplomas will be forwarded to the successful competitors as early as possible after the close of the Exhibition, when names have been engraved and diplomas signed.

PRIZE POOL ALLOCATION

Classes attracting six or more entries will enjoy prizes to value of 1st £5; 2nd £3; 3rd £1. With over 12 entries 1st £7; 2nd £4; 3rd £2; 4th £1. Classes under six will have 1st and 2nd only, or at the discretion of the judges. Prizes may take the form of Vouchers, Cash, Replica Trophies (for Challenge Trophy winners) or Championship Trophies.

● COMPETITORS

£300 in prizes; some 30 cups, trophies and other awards. Challenge cups of national status. Championship cups for permanent retention.

● ENTRY CLASSES

Every form of model and model engineering activity can be entered including locomotives, aircraft, cars, boats, yachts, radio control equipment . . . in fact, anything you can make. Write for entry forms and details

● SEE & BUY

Full model trade support with well stocked stands.

● SPECIAL ATTRACTIONS

Continuing a policy of change whilst retaining popular features, we shall this year have stands looking in towards a central model display system. At the entrance a small circular pool will provide an area for operation radio controlled boats. Surrounding this a circular area will offer opportunities for further electric powered aircraft (so popular last exhibition): plus space for some radio controlled cars to show their paces. In general better lighting and more elegant display units will enhance model appearance.

The ever green live steam exhibit with passenger carrying of visitors of all ages behind miniature steam locomotives will again be under the direction of Mr. Bill Carter and his colleagues of the Society of Model & Experimental Engineers. A working S.M.E.E. feature will be faced by a typical model engineer's workshop where the Editor of Model Engineer assisted by contributors and members of the S.M.E.E. will be in attendance.

Nearby, in the Bryanston Room *a further railway track* will offer another 75 ft. stretch, and here entries for the new LBSC Memorial Bowl competition—which demands a track test as well as beauty—will be judged. Visiting clubs will also be invited to " bring an engine " and book public demonstration time at Seymour Hall. This is another Model Engineer " first ever! "

Also in operation will, we trust, be some of the " babes " of steam in Gauge O and Gauge 1. In the LECTURE HALL a working CAR CIRCUIT will be available for visitors to try their skill during the day and to offer exciting competitive racing each evening.

In the galleries (which also offer several hundreds of seating places for packet lunchers or tired visitors to rest and watch from above) will be displays of " junior models " which may take any form from plastics to Meccano or to working model boats. The " boys' exhibition " last year under Commander Guffick, O.B.E., was most encouraging and will be expanded.

● SOUVENIR GUIDE

Another CHRISTMAS EXTRA issue of Model Engineer will be coming out 2nd Friday in December with entries, trade stands, articles galore to assist the visitor and solace the stay-at-home.

● PARTIES

Special reductions for parties, school and pre-booking. Ask for details. Save money and avoid queueing! Route maps, parking places, full particulars on request.

● WORKING LOCOMOTIVE CLASS

A new contest class with the LBSC Memorial Trophy and £10 award will be continued. Points for performance—locomotives must have a track trial at the show to qualify—Ask for conditions of entry.

Enquiries for Competition Entry Forms, Trade Stands, to **EXHIBITION MANAGER, M.A.P. LTD., 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.**

CLASSIFIED ADVERTISEMENTS

PRIVATE: Minimum 18 words 6s. and 4d. per word for each subsequent word.
TRADE: Minimum 18 words 12s. and 8d. per word for each subsequent word

Box numbers count as six words when costing the advertisement. When addresses are included, these are chargeable at the same rate (4d. or 8d.) per word as the remainder of the advertisement. Copy and box number replies should be sent to the Classified Advertisement Department, MECCANO Magazine, 13-35 Bridge Street, Hemel Hempstead, Herts. Latest copy date for insertion in the August issue is June 3rd.

FOR SALE

Meccano Lighting Set M280, pre-war, complete and mint condition. Unused, in original box. Offers invited. Digger-bucket 169, mint condition and several other items. S.A.E. for reply. —10 Haylynn Street, Glasgow W.4. S

M.M.'s, December, 1956-December, 1963, complete in excellent condition. Offers to—C. I. Johnston, 9 Willowvale, Dundonald, Belfast. S

Battle of Britain. D-Day. Afrika Korps. Trafalgar and many more fascinating wargames. Also the exciting American STRATEGY & TACTICS War-gaming Magazine. Rush just 1s. 6d. for full lists to—Iain H. McLellan, Dept. M., 12 South Road, Wick, Caithness, Scotland, U.K. P-A

Collectors' Surplus, obsolete Dinky toys for sale. Stamped addressed envelope for lists.—Box No. 31 (London), Meccano Offices, Hemel Hempstead, Herts. RST

Meccano No. 10 Set, many obsolete parts, also including Gears Outfit "B," Mechanisms Outfit, Elektrikit and assorted motors and Mamod steam engines. Well used but serviceable. Bargain for the enthusiast at £25.—Phone: Hemel Hempstead 56897. S

Red Green Meccano Spares, obsolete items, also outfits. Wants list to—Hearn, 155 Nutfield Road, South Merstham, Surrey. S

Offers Invited for unique Meccano items: Crystal sets, 1922, 1923 and 1924, all good condition. Butter Churn, 1914, excellent condition. Sensible offers only please as these are very rare items. S.A.E. to—P. Matthews, 56 Hameway, East Ham, London E.6. S

Obsolete Meccano Electric Motor (EO20)S. Also Meccano Marshall controller. Both new. Offers invited. S.A.E.—Grimshaw, 25 Hawthorn Road, Yeadon, Leeds. S

O Gauge Hornby train sets, rails and accessories, spare locomotives, trucks pre-war and post-war.—Box No. 32 (Worcs.), Meccano Offices, Hemel Hempstead, Herts. S

Meccano Outfit No. 9 plus accessories. M.M.s. 1942-68, old literature parts, Scalextric track —David Allew, 11 Chestnut Avenue, Leigh Lancashire. S

Veteran Meccano Club Meccano aero-dynamic model, jet-age action with emphasis on PERFORMANCE. Ingeniously simple and effective intermittent trigger action an extra feature. A feature issue, in presentation gold-lettered folio, red simulated morocco and complete illustrations description for building and working this marvel of a model. Copyright copies, a few available at 7s. 6d. per copy.—10 Haylynn Street, Glasgow W.4. S

WANTED

Spot-On Model 806 Rolls-Royce (heavy type). Must be complete and mint condition. Your price paid.—F. Keenan Jun., Glencairn House, Barnton, Edinburgh. S

Dinky Toys, tinplate models, in fact all pre-1939 models wanted by collector. Your price paid. —73 Waterford Road, London, S.W.6. Tel: 01-736 8124. R-W

Pre-war Meccano, Meccano magazines any super model leaflets, price and condition to—L. Skeggs, 33 Tine Road, Chigwell, Essex. RST

Coins Wanted. Mixed. World. School-boy collections. £1 per 100. No zinc or aluminium. —Williams, 41 Garnetts, Takeley, Essex. P-A

Pre-war and Early Post-war Dinkys, Tootsietoys, Minics, etc. High prices paid.—D. Pinnock, 10 Hurstville Drive, Waterlooville, Hants. Tel: 2958 (evenings). N-X

Collector Seeks old trains and other toys, anything repairable considered. Write details, prices.—14 Wren Avenue, Southall, Middx. H-S

Pre-war model trains sought by Lowke, Marklin, Bing, etc., O or larger, also tinplate toys.—Church, 10 Hill, Patcham Village, Brighton. 53940. T-C

Dinky Toys, commercial vehicles wanted. Super toy lorries, equipment any condition, cash. Write—D. Watt, 48 Windermere Road, Muswell Hill, London, N.10. S

Dinky Toys Wanted by collector, numbers: 152, 159, 161, 185, 260, 268, 282, 283, 295, 343, 430, 431, 454, 465, 472, 481, 490, 621, 622, 623, 626, 661, 676, 677, 921, 923, 949, 966, 982. Write—D. Hardman, 20 Linden Road, Tunnel Hill, Worcester. S

Meccano Sets 8A, 9A wanted, or alternatively No. 10 set.—Morton, Barnett Villa, Wingate, Co. Durham. S

Wanted. Mint Dinkys 280 coach, 289 Routemaster Festival transfers, 292-293 buses, 943 Leyland Esso tanker for sale, models including military and Yesteryear.—Box No. 33 (Surrey), Meccano Offices, Hemel Hempstead, Herts. S

Dinky Atlanteans in reasonable condition. Write stating price to—C. Greedus, 82 Marten Road, Walthamstow, London E.17. S

Meccano E6 Reversing Motor, long side-plates, blue-red, and or all enclosed type, red 6-v. type. Blue only 1A or 2 clockwork motors, preferably French Meccano versions. Condition not very important. Also early 3-rail type locomotives, passenger-class OO gauge, any make, working condition.—10 Haylynn Street, Glasgow W.4. S

Gauge O Hornby or Bassett-Lowke, etc., trains wanted by private enthusiast.—8 Sandy Hill Road, Wallington, Surrey. 01-647 1264. ST

Wanted. A small model dynamo please for my boy who cannot get one.—Talbot, 33 Romola Road, London S.E.24. S

BOOKS

Top Wargamers read Miniature Warfare, the world's leading monthly magazine for wargamers and wargaming. For a trial copy send 4s. (65c) and a 12" x 9" s.a.e. (U.K. 5d., Overseas 3 I.R.C's) to—Miniature Warfare Dept. M.M., 61 Benares Road, Plumstead, London S.E.18, England. Trade enquiries welcome, wholesale or retail. S-D

GENERAL

We Specialise in Meccano Spare Parts. By return Mail Order. S.A.E. for list.—Bagnalls, Salter Street, Stafford. Tel: 3420. RS

STAMPS

Free ! Three attractive short sets when requesting bargain approvals. Enclose postage.—D. M. Howlett, (M.A.D.P.S.), 103 Pauntley Road, Christchurch, Hants. S

CARS—TRADE

Modern Steam Cars, switch-on start. Steamboats and stationary engines also described. Magazine with coloured brochure, many pictures 5s. 6d. ($0.70).—Steam, Kirk Michael 16, I.O.M., G.B. S

PLANS

Plans Enlarged or Reduced and additiona copies made. Send for details from—Causer & Co., 216 Goldhawk Road, London W.12. SHE 2366. O-T

CHEMICALS AND APPARATUS

You can now buy Chemicals and Apparatus —Test-tubes, Beakers, Flasks, Filter Paper —everything you need to build up your own HOME LABORATORY!

You save money by ordering Direct from Suppliers. Send 6d. stamps NOW for Latest List and Order Form.
(Overseas enquiries welcomed)

P.X. TECHNICAL SUPPLIES,
53, Eldon Street, Sheffield, 1

GREAT BRITAIN
2/6, 5/- & 10/- FREE

This packet of stamps is given absolutely **FREE** to all genuine applicants for my superior **used** British Colonial Approvals enclosing 4d. in stamps for postage. Overseas Applications invited.

D. L. ARCHER (M),
2, LITCHFIELD WAY, BROXBOURNE, HERTS.

CHEMICALS & APPARATUS
THE WIDEST RANGE
Experiment Booklet 2/-, post paid
Send S.A.E. for list to :
A. N. BECK & SONS
147 HIGH ROAD, LONDON, N.15
Tel : 01-800 7342

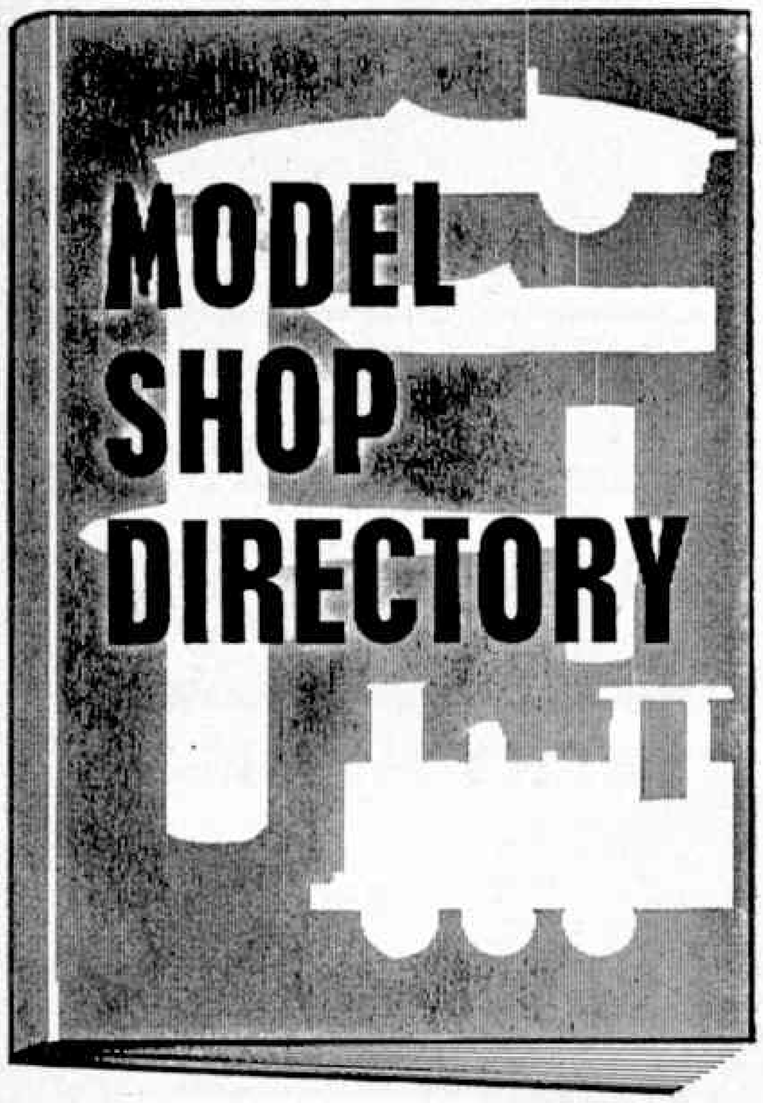
SELL WHAT YOU NO LONGER NEED

There must surely be a buyer somewhere in the forty thousand or more people who read our Magazine, and it costs only 4d. a word for a classified advertisement. (Traders 8d. a word).

SELL THAT OLD TRAIN SET !

YOU COULD USE THE MONEY TO BUY SOMETHING ELSE

Send your ad. and a postal order to the MECCANO MAGAZINE CLASSIFIED ADVERTISEMENT DEPT., 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTFORDSHIRE. If in doubt telephone Hemel Hempstead 2501-2-3.



These shops stock all the goods Meccano Magazine readers need.

M denotes Meccano accessory and spare parts specialists

AUSTRALIA

Tel: 61-3603

HEARNS HOBBIES
Mail Order Service
303 FLINDERS STREET, MELBOURNE 3000
Suppliers of Aeromodeller Plans and Books, **Model** Aircraft - Boats - Cars - Railways - **Engines** - Accessories - R/C Equipment.
Write for Price List.

BATH

Tel: 60444

CYRIL HOWE'S
CHEAP STREET,
BATH, SOMERSET.
The Model Shop of the West for all your modelling requirements. Aircraft, Boats, Engines, Radio Control. Expert advice available. M.A.P., Meccano Sets, spares, etc.

BEACONSFIELD

Tel: 4092

C. G. MARSHALL,
MAXWELL ROAD,
BEACONSFIELD, BUCKS.
M

BIRMINGHAM

Highbury 3237

KINGS HEATH MODELS
5 York Road, Birmingham 14.
Everything for the modeller: Boats, Cars, Planes, Railways, Kits, etc. **Meccano sets and reasonable stocks of spares.**

BLACKPOOL

Tel: Blackpool 24061

BATESON'S SPORTS DEPOT LTD.,
56 ABINGDON STREET,
BLACKPOOL.
Complete Stocks all through the Year.

BOURNEMOUTH

Tel: Bournemouth 23248

BRUCES TOYS LTD.,
87-89 OLD CHRISTCHURCH ROAD, BOURNEMOUTH.
We stock a wide range of Meccano Toys and outfits with adequate spares for expanding outfits.

BRISTOL

Tel: 38534

M. H. B. DAWSON,
96 WHITELADIES ROAD,
BRISTOL, 8.
M

BRISTOL

Tel: 557527

MAX WILLIAMS,
LAWRENCE HILL,
BRISTOL 5.
Meccano Model Railways, Peco Wills, Slot Racing, Hobby Kits, Dinky, Corgi and all spares.

CARLISLE

Tel: Carlisle 23142

PALACE CYCLE STORES,
122 BOTCHERGATE,
CARLISLE.
Meccano Stockists for Airfix, Dinky, Matchbox, etc.

CHATHAM

Tel: Medway 45215

W. PAINE & CO. LTD.,
168 HIGH STREET,
CHATHAM.
M

CREWE

Tel: Crewe 55643

EVELYN WILSON,
86-88 MARKET STREET,
CREWE, CHESHIRE.
Meccano Sets — Accessories and Spares — Hornby Tri-ang Train Sets—Accessories and Spares—Frog Kits.

DORCHESTER

Tel: 300

BRAGG'S SPORTS DEPOT,
15 HIGH WEST STREET,
DORCHESTER, DORSET.
Stockists for whole range of Meccano, Trains, etc., also Travel Goods, Toys and Games.

ELGIN

Tel: Elgin 2569

GEO. A. SMITH,
10 BATCHEN STREET,
ELGIN.
All your Meccano and Dinky requirements are in stock always.

GLASGOW

Tel: 041-332-7040

COPLANDS,
SAUCHIEHALL STREET,
GLASGOW, C.2.
Meccano Plastic and traditional sets, **Playdon** sets, etc.

GUILDFORD

Tel: 61331

THE GUILDFORD DOLL'S HOSPITAL LTD.,
13 SWAN LANE,
GUILDFORD.
M

HEMEL HEMPSTEAD

Tel: 53691

TAYLOR & McKENNA
203, MARLOWES
M

KENT

Tel: Erith 32339

DERRETT (TOYS) LTD.
52/54 ERITH HIGH STREET,
ERITH, KENT
Aircraft, Boats, Fibreglass Hulls, Tri-ang Hornby, Lima H.O., H. & M. Units, Scalextric, Airfix, Riko, Pactra, Plastic kits, Minitanks, Marquetry. Prompt Mail Order Service.

KENT

Tel: Dartford 24155

MODERN MODELS LTD.
49/51 LOWFIELD STREET,
DARTFORD, KENT.
For all your modelling requirements. Radio/Control, Aircraft, Boats, Cars, Railways. All leading makes from The Shop with the Stock. Prompt mail order service.

LEEDS

Tel: 0532-26611

KING CHARLES SPORTS CENTRE,
RAILWAY HOUSE,
KING CHARLES STREET, LEEDS, 1
Specialists and stockists in all model railway equipment and accessories. Tri-ang-Hornby, Trix, Fleischmann, Gem, Hammant & Morgan, Sommerfeldt.
Cat. service 25/- home, £2 overseas.

LEEDS, 1

Tel: 25739

BRADFORD MODEL RAILWAY CENTRE,
23 ALBION PLACE,
(Off Briggate).
The North's Leading Model Railway stockists in OO and N gauges. Branches at Cloth Hall Street, Huddersfield and Frizinghall, Bradford.

LEICESTER

Tel: Leicester 21935

RADIO CONTROL SUPPLIES LTD.
52 LONDON ROAD.
Mail Order Specialists.
Closed Monday.
Open until 8.30 p.m. Friday.
The Showroom of the Midlands with full R/C service facilities

LIVERPOOL

Tel: 709-7562

LUCAS'S (HOBBIES) LTD.,
7 TARLETON STREET,
LIVERPOOL 1.
HOBBIES or everything the model maker requires. Aeroplanes, Cars, Chemistry Sets, Railways, Meccano Building Kits, Instructional Toys, also a selection of Games, Dolls and Soft Toys.

LONDON

Tel: HOL 6285

BEATTIES OF LONDON,
112 & 112A HIGH HOLBORN,
LONDON W.C.1.

M

LONDON

Tel: Lee Green 2637

LEWISHAM MODEL CENTRE
45 LEE HIGH ROAD, LEWISHAM, S.E.13
Everything for the Modeller. Aircraft, Boats, Radio Control, Railways, Cars. Spares and Repairs our speciality.
Mail Order a pleasure.

LONDON

Tel: Regent 1846

JEREMY,
16 PRINCES ARCADE,
PICCADILLY, LONDON, S.W.I.

M

LONDON

Tel: CHE 4887

RADIO CONTROL SUPPLIES
154 MERTON ROAD,
WIMBLEDON S.W.19
Closed all day Monday.
Open until 8.30 p.m. Friday.
Largest R/C stockists in the country.

LONDON

Tel: ISLeworth 0743

RADIO CONTROL SUPPLIES LTD.
581 LONDON RD., ISLEWORTH, MIDDX. **Mail Order Specialists**
Open each weekday and until 8.30 p.m. Fridays.
Largest R/C stockists in the country.
Own R/C service centre.

LONDON

Tel: Mill Hill 2877

H. A. BLUNT & SONS LTD.,
133 THE BROADWAY,
MILL HILL, LONDON N.W.7.

M

LONDON

Tel: 01-529 1250

"LEISURE TIME"
4 STATION ROAD, CHINGFORD, LONDON E.4.
Aircraft, Electric Cars, Boats, Railways and Accessories, Plastic Kits, Modelling Activities.
Secondhand models section.
All models bought, sold and exchanged.

LONDON

Tel: 01-445 6531

MICHAEL'S MODELS
646-8 HIGH ROAD,
N. FINCHLEY, N.12.
Comprehensive range of kits and modelling accessories. Stockists of Fischer Technik, the new action construction toy.
Mail Order a Pleasure.
Closed all day Monday. Easy parking.

MAIDSTONE

Tel: 51213

MODELCRAFT
40 UNION STREET,
MAIDSTONE, KENT.
Everything for the average modeller. Cars, Aircraft, Boats, Railways.
SPARES AND REPAIRS. MAIL ORDER.

MANCHESTER

Tel: Blackfriars 3972

THE MODEL SHOP
7-13 BOOTLE STREET,
OFF DEANSGATE,
MANCHESTER 2.
THE NORTH'S LEADING MODEL, HOBBY AND TOY SHOP. MECCANO SETS AND SPARE PARTS A SPECIALITY.

M

NEW ZEALAND

BUNKERS LTD.,
P.O. BOX 58,
HASTINGS
(Mail orders from all countries welcomed.)

M

READING

Tel: Reading 51558

READING MODEL SUPPLIES
5 Chatham St. Car Park, Oxford Road
READING, BERKSHIRE.
BERKSHIRE'S MODEL CENTRE
You can drive right to us

ST. ALBANS

Tel: 59234

BOLD & BURROWS LTD.
12-22 VERULAM ROAD,
ST. ALBANS, HERTS.
Meccano Sets and Spares

SCARBOROUGH

Tel: Scarborough 3223

"WALKERS,"
15 ST. THOMAS STREET,
SCARBOROUGH, YORKS.
(Mail orders welcomed.)

M

STAFFORD

Tel: 3420

JOHN W. BAGNALL LTD.,
18 SALTER STREET,
STAFFORD.

M

STOCKTON-ON-TEES

Tel: 67616

LESLIE BROWN,
Super Toy and Model Store,
95 HIGH STREET,
STOCKTON-ON-TEES.

M

WATFORD

Tel: Watford 44222

CLEMENTS,
THE PARADE, WATFORD.
Always a comprehensive range of Meccano Sets, Accessories and Dinky Toys.

WESTON-SUPER-MARE

Tel: Weston 6600

RADIO CONTROL SUPPLIES LTD.,
1 THE CENTRE,
WESTON-SUPER-MARE, SOMERSET.
Open until 8.30 p.m. Friday.
Largest R/C stockists in the country.
Own R/C service centre.

SURREY

Tel: Camberley 5926

JOYLAND,
56 HIGH STREET,
FRIMLEY, SURREY.
Full range of Meccano and Spares
Triang Hornby Railways. Scalextric. Lego
Largest selection of toys and games in the area

M

WORTHING

Tel: Worthing 9530

J. H. MILLER (CYCLES) LTD.,
21-23 HIGH STREET,
WORTHING, SUSSEX.
Everything for the Modeller. Meccano, Tri-ang/Hornby, Keil Kraft, Minic, Scalextric, Airfix, etc.

MODEL SHOP OWNERS

Use our Model Shop Directory

Write to Meccano Advertisement Offices:
MODEL & ALLIED PUBLICATIONS LTD.
13/35 Bridge Street, Hemel Hempstead, Herts.

Humbrol brushes & Humbrol enamel...

...the perfect modellers finish!

A COMPREHENSIVE RANGE OF MODELLING BRUSHES

Sizes 00,0 & 1	9d. each	6	1/3	each
" 2 & 3	10d. "	7	1/6	"
" 4 & 5	1/- "	8	1/9	"

CAMEL MOPS

Size	2 a	2/6	each
"	3 b	3/-	"
"	4 c	3/6	"

GOAT MOP 9d. "

ALWAYS DEMAND A

HUMBROL

PRODUCT

HUMBROL · HULL · YORKSHIRE

Prices shown are those recommended in U.K.

Printed in Great Britain by ELECTRICAL PRESS LTD., Maidenhead, Berks., for the Proprietors, MODEL & ALLIED PUBLICATIONS LTD., 13/35 Bridge Street, Hemel Hempstead, Herts. Published by the ARGUS PRESS LTD., 12/18 Paul Street, London, E.C.2, to whom all trade enquiries should be addressed.
Registered for transmission by Magazine Post to Canada.

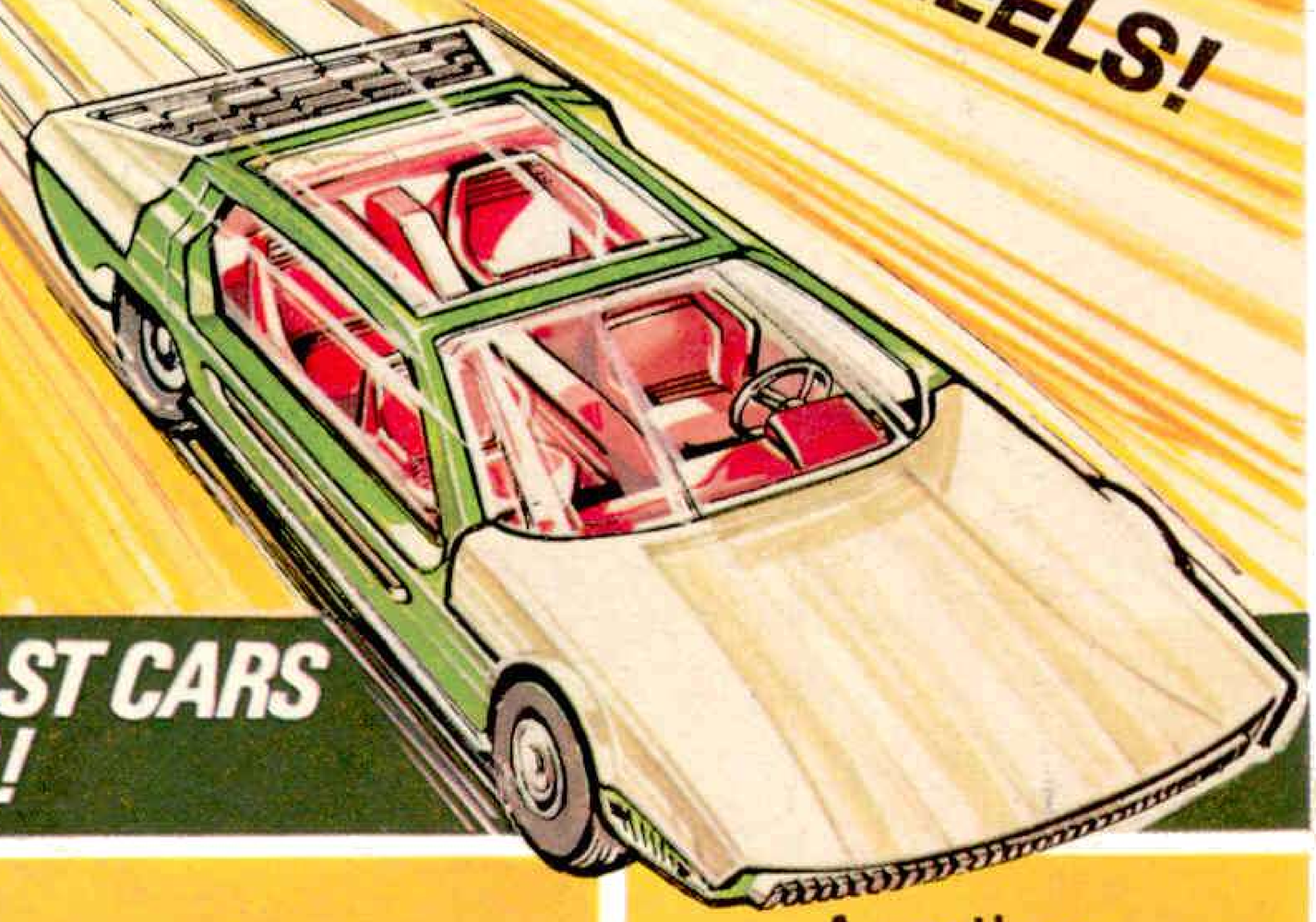
MM PHOTO COMP COUPON JULY 1969

DINKY TOYS®

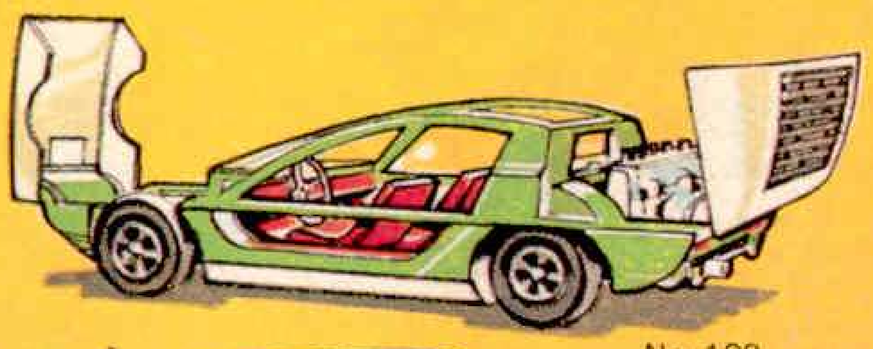
BRING YOU NEW

SPEEDWHEELS

FANTASTIC FREE-ROLLING WHEELS!



FOUR NEW SUPER FAST CARS WITH SPEEDWHEELS!



No. 189

No. 174

No. 173

No. 217

You're out in front with these new Speedwheels models from Dinky. They just keep on rolling, past all the other cars. Because these new Speedwheels have rollability – plus.

No. 189 Lamborghini Marzal
No. 174 Ford Mercury Cougar
No. 173 Pontiac Parisienne
No. 217 Alfa Romeo O.S.I. Scarabeo

Another FIRST FROM DINKY TOYS®

the tough, action-packed models